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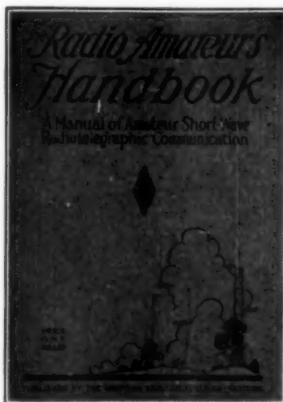
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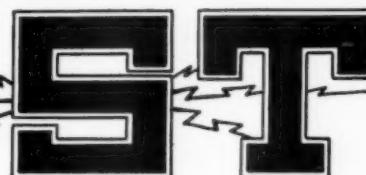
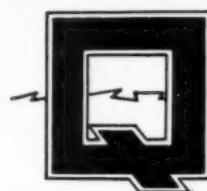
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Hartford, Connecticut, U. S. A.



The Official Organ of the A.R.R.L.

VOLUME XIV

JULY, 1930

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QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A.
Official Organ of the A.R.R.L. and the International Amateur Radio Union

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Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, \$2.50 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, \$3.00 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

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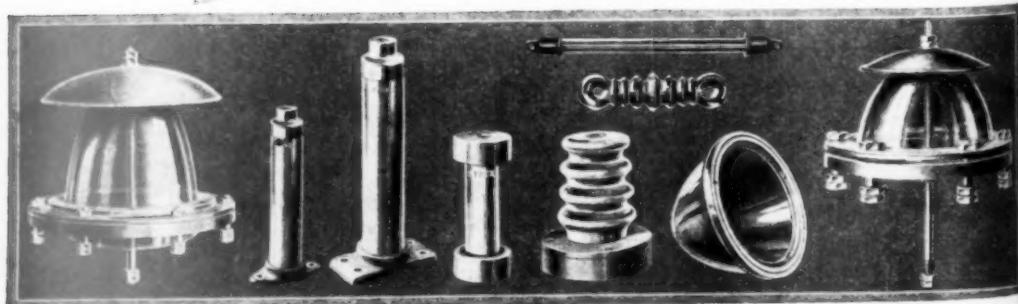
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EDITORIALS

A SIGNIFICANT feature at the recent meeting of our Board of Directors was the very lively advance interest which had been shown by members in the important topics which were to come up for discussion. Helped somewhat by the preparation of a list of topics some weeks in advance of the meeting, and by the usual call in *QST* urging members to communicate their views to their directors, the meeting had the advantage of an unusually complete expression of amateur opinion and desire. It is a sign of good health in an organization when its members actively interest themselves in its affairs and when, as this year, they so well unite in viewpoint and general sanity of comment.

This was very well shown in the study of out-of-band operating. There was little question that when the Board met the directors would feel that the Government ought to be asked to undertake better enforcement of allocations, but what would the members think of such a course? The answer was clear, because the members of every division had expressed themselves in advance, voluntarily to their directors, and in emphatic language. That, we say, is a good sign.

This lively interest was particularly evident in the 'phone question. Many points of view had been expressed. There were, of course, some requests to widen the 3500-3550 'phone band, many to keep it as it is, some to shift it to the other end of that band; suggestions to make the use of oscillator-amplifier transmitters compulsory; and many suggestions concerning the desirability of increasing the qualifications required of the 'phone operator. Experienced 'phone men in particular joined in sponsoring this last suggestion. The Board's job in deciding upon a course that represented "the greatest good to the greatest number" was a difficult one, but nothing like as difficult as it would have been without the very extensive expression of opinion which had been made by members everywhere.

The Board's eventual decision, as reported elsewhere in this issue, was to seek no change in the size or location of the 3500-kc. 'phone band, to frown upon any specifications of apparatus, but to sponsor a new grade of operator's license to be required for all 'phone operating, the basic requirements of which would be the possession of special technical qualifications and at least a year's C.W. experience. 'Phone transmission must be recognized as an advanced form of communication, the fundamental requirement for which is the possession of a very high-grade C.W. station. To operate it intelligently the amateur must first be a skilled and experienced C.W. operator. The 'phone bands are badly congested today, but not with good 'phones. The 'phone amateurs consist of a small number who are well-versed technically and seriously interested in doing a good job in a very difficult field, and a large number of "punks" who make the night hideous with unintelligent efforts directed at inadequate equipment. The League's present plan for 'phone thus proposes a big improvement for the legitimate 'phone operators by the eventual removal of the poor 'phones. The elimination of amateurs without the qualifications or the enterprise to learn the code, and of C.W. amateurs who are just "messing around" temporarily with 'phone, is the biggest favor that could be done the 'phone man. The good 'phone man deserves protection and the right to adequate operating facilities. The Board's action will clear the air for him, and the good 'phone man will be well pleased with the change.

K. B. W.

Your Broadcast Receiver as a Short-Wave Superhet

A "Converter" Which Actually Converts
By George Grammer, Assistant Technical Editor

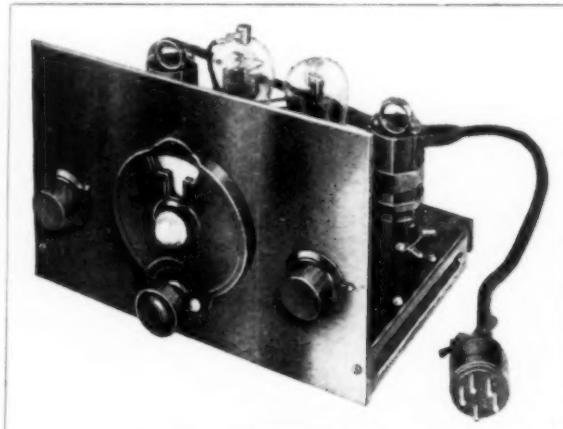
The development of a satisfactory S.W. converter was undertaken by the QST technical staff because of a real demand, as evidenced by letters received by the Technical Information Service, for a "short-wave converter" to be used in conjunction with the usual broadcast receiver, particularly the types which are a.c. operated. The converter is applicable to the amateur field, notably in amateur radio-telephony, as well as to high-frequency broadcast reception. — EDITOR.

THE possibility of adapting a broadcast receiver to short-wave reception has always been attractive but the evolution of a satisfactory converter has not been so easy. Most attempts at converter design have aimed at using only the audio amplifier of the broadcast receiver with an autodyne detector for the high-frequency end, although a few have made a stab at the superhet idea, using the r.f. amplifier as the intermediate amplifier for an oscillating first detector. Either of these systems has a number of disadvantages. The regenerative detector (working into the receiver's audio amplifier) is not sufficiently selective for 'phone reception and entirely ignores the excellent r.f. amplifier with which the modern broadcast receiver is equipped. The autodyne superhet uses the r.f. amplifier of the receiver but does not give it much opportunity to do its stuff, because the detector circuit must be tuned off the incoming frequency by the beat frequency (intermediate frequency) and both sensitivity and selectivity are sacrificed.

It is obvious, therefore, that the ideal converter should be one which utilizes to the utmost all the features of the broadcast receiver. This requirement indicates a superhet converter for the high-frequency end. For the realization of maximum selectivity and sensitivity, the converter must have separately tuned oscillator and

first detector circuits. The problem of using the broadcast receiver simply resolves itself into the design of a detector and oscillator for high-frequency work.

The advantages of a high intermediate frequency for short-wave reception have previously been pointed out in *QST*.¹ With the broadcast receiver it is possible to choose any frequency between 500 and 1500 kc. at will — a considerable advantage, since a slight shift in the i.f. will often mean the disappearance of unwanted interference. A further desirable result of this freedom of choice is that small differences in the short-wave coils in the oscillator and first detector can be compensated for in the tuning of the broadcast receiver itself, thus to some extent obviating the necessity for cutting the coils to the



FRONT VIEW OF COMPLETE CONVERTER

last quarter turn — the bugaboo of all short-wave receiver coil construction. Finally — and in some respects this is the most important advantage of all — it is possible to cover a 1000-ke. band at any portion of the high-frequency spectrum by doing all tuning *on the broadcast receiver itself*. A preliminary adjustment of the controls on the converter to the proper setting, which need only be determined *once* by experiment, is all that is necessary. This means that tuning at 20,000 kc. is as easy as at 600 kc. in the regular broadcast

¹ "Improving Short Wave 'Phone Reception," *QST*, March, 1929.

band — and anyone who has tuned the usual type of short-wave regenerative receiver doesn't require further explanation! Essentially, the usual superhet procedure is reversed, and instead of using a variable oscillator frequency and a fixed i.f., the intermediate frequency is varied and the oscillator frequency is fixed.

There are many ways in which such a converter (and this really is a converter, because it serves as a medium for converting a high frequency into a lower one) can be constructed. The fundamental requirements are a high-frequency detector, an oscillator which will produce a 500- to 1500-ke. beat with the incoming signal, and a means of mixing the two and feeding the result into the broadcast set. Although any of the many varieties of detector and oscillator circuits may be employed and their coupling may be effected by several different means, it is desirable to have an arrangement in which the tuning of the first detector and oscillator is independent (insofar as such a thing is possible) to avoid interlocking of controls and resultant tuning difficulties. In this respect some circuits are better than others; the one shown in the diagrams avoids such obstacles to a large extent.

SOME IMPORTANT CONSIDERATIONS

Before taking up the constructional details of the converter, it is well to consider how it is to be used. It can be combined with any broadcast receiver which has a good r.f. amplifier, even a regular super-heterodyne, but it cannot always be connected to obtain plate and filament voltages from the receiver itself. If the receiver has three or more stages of radio-frequency amplification with heater-type a.c. tubes, the first r.f. tube can be removed from its socket and the converter plug inserted in place of it, providing the remaining two stages have sufficient gain to make satisfactory reception possible. This of course depends entirely on the construction of the broadcast receiver itself, and a trial will probably be necessary to determine whether or not it will work out satisfactorily. A receiver which has only two r.f. stages, even though screen grid tubes are used in them, is not adaptable to such use of the converter, because only a single i.f. stage remains if the first tube is removed. Although some of the more powerful stations come through weakly, the results are not gratifying.

When separate plate and filament supplies are provided for the converter, however, these drawbacks are overcome, and its use is not restricted to sets using any particular type of tube or number of r.f. amplifier stages. This does not necessarily mean that the power supply in the broadcast receiver cannot be used; the objection is simply to taking the supply through a socket from which a tube must be removed. Many broadcast receivers, including d.c. sets which have been modernized with a.c. power supplies, have power-

packs which are readily accessible; in such a case it is only necessary to tap off the requisite voltages and connect to the proper posts on the converter. In the extreme case, however, where the set has been put together with rivets, or the owner does not care to "take chances" the only extra equipment necessary is a 90-volt battery or eliminator and a 2½-volt transformer for filament supply, neither of which is very expensive.

In fact, it is recommended that wherever possible the plate and filament supplies for the

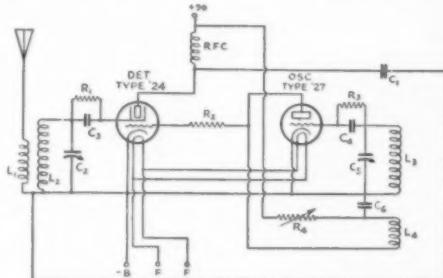


FIG. 1. — WIRING OF THE CONVERTER WHEN USED WITH SEPARATE PLATE AND FILAMENT SUPPLIES

C_1 — 500 μufd .
 C_2 — 50- μufd , midget condenser.
 C_3 — 100 μufd .
 C_4 — 100 μufd .
 C_5 — 50- μufd , midget condenser.
 C_6 — 2000 μufd .
 R_1 — .75 megohm.
 R_2 — 50,000 ohms.
 R_3 — .5 megohm.
 R_4 — 50,000-ohm variable resistor.
RFC — Radio-frequency choke suitable for broadcast band.
Coil Data:

Approximate Range	Detector		Oscillator	
	L_1	L_2	L_3	L_4
5000-7000 kc.	12	16	20	9
8000-13,000 kc.	7	8	9	4
13,000-19,000 kc.	5	5	5	3
3500-ke. band	15	30	30	10
2000-ke. band	7	12	13	6

All wound with No. 22 d.s.c. on forms 1 ½ inches in diameter.

converter be obtained by means other than through a plug which replaces one of the r.f. tubes.

CONSTRUCTION OF THE CONVERTER

Referring now to Fig. 1, it will be seen that a Type '24 screen-grid tube is used as the first detector. This type of tube is a more sensitive detector than the regular three-electrode tube, and in addition the extra grid is advantageous in that it provides a good means of coupling between the detector and oscillator, when used as shown in Fig. 1, without causing annoying interlocking between the two tuning controls. A Type '27 is used as the oscillator.

L_2 and C_2 comprise the tuned grid circuit of the first detector, and this circuit is adjusted to the frequency of the incoming signal. The oscillator employs the very common tickler circuit,

the resistor R_4 serving as a regeneration control. Coupling between the oscillator and first detector is provided by the resistor R_2 , connected between the plate of the oscillator and the inner grid of the detector. Once again, lest there be any misunderstanding, the inner grid is connected to the cap which comes through the top of the tube. In this case the '24 is acting as a space-charge detector, the grid leak and condenser being con-

sacrificed by using a plug, because it is an easy matter to get at the "A" and "B" batteries or eliminators, and consequently the full amplification of the set can be realized. The constants are again the same as those in Fig. 1, with the exception of the extra resistors listed. Care should be taken to see whether either side of the "A" battery is connected to ground in the broadcast receiver, and if so, the "G" post on the converter should be left unused.

Pilot coil forms were chosen as the winding forms. Any other type of form of the same diameter ($1\frac{1}{2}$ ") can of course be used without change in the coil specifications. The Pilot forms are easily identified in pairs, however, because it is possible to use differently colored rings for each set of coils. Moreover, the first detector and oscillator coils can be differentiated by removing the unused pins from the forms; the method of making connections allows this since only three pins are required for the detector coil and four for the oscillator.

The arrangement of the connections on the coil sockets used in the converter shown in the photograph is given in Fig. 4. While other combinations may be used just as readily, those depicted will result in no harm to the tubes or batteries if a coil is inadvertently put in the wrong socket. The coils should never be placed in the sockets intended for the tubes, however! The turns of both windings on each form should be wound in the same direction; this is particularly important with the oscillator coils because if the connections and direction of windings are not correct, no oscillations will be set up and no signals will be heard.

As is usual with any short-wave receiver, it is advisable to keep all wires carrying r.f. separated as much as possible from other wires, and avoid closely paralleling them.

OPERATION

On this particular model the large dial in the center is the control for the oscillator tuning condenser; the small knob on the left is the first detector tuning condenser, and the similar knob on the right is the oscillator regeneration control.

If one has had no experience in operating a superhet when the various controls were not ganged together, it may take a little time to get the "feel" of the set. When all adjustments are properly made the first detector will not oscillate, and neither will the broadcast receiver itself (some sets will when the volume control is turned too high); therefore the "background," the hissing noise accompanying the operation of a heterodyne or autodyne receiver, will be comparatively low in volume. It may be necessary to provide a home-made background for preliminary tuning and an ordinary buzzer may be used for this purpose. It should be connected to a battery, and a single wire run from one of the

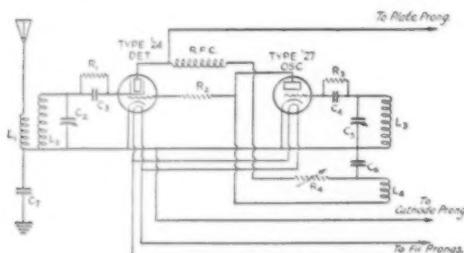


FIG. 2. — WIRING DIAGRAM WHEN PLUG IS USED
 $C_7 = .006 \mu\text{fd.}$

All other constants same as in Fig. 1.

nected to the screen grid. In addition to serving as a coupling link between oscillator and detector, R_2 also drops the plate voltage down to the proper value of inner-grid bias for space charge detection.

The connections in Fig. 1 are used when separate plate and filament supplies are available, or when the proper voltages can be taken from the regular receiver power-pack without recourse to a plug which necessitates the removal of one r.f. tube. This arrangement is much to be preferred to the plug method because, as mentioned above, the amplification is greater, and it is unnecessary to remove or replace a tube every time a change is made from the regular broadcast band to short waves and *vice versa*.

All connections to the converter except one may be permanent, and the single connection which must be changed is the antenna. The post marked "G" in Fig. 1 is connected permanently to the ground post on the receiver, and the post marked "A" is connected to the antenna post, the antenna itself being transferred to L_1 . A switch can be installed to make this change, and the transfer from regular broadcasting to short-wave reception accomplished by throwing the switch. It is well also to include an "on-off" switch in the filament supply to the converter.

If, in spite of the recommendations above, the builder prefers to remove the first r.f. tube in the receiver and obtain the "A" and "B" supplies for the converter through a plug, the connections shown in Fig. 2 should be used. The constants are the same in either case, the difference being in the method of transferring the signal from the converter to the broadcast set.

With d.c. operated broadcast receivers, the connections in Fig. 3 may be used. In this case there is nothing to be gained and much to be

buzzer terminals to the antenna post on the converter. Some locations, particularly in city districts, are very noisy, and there is often enough electrical racket from street cars, automobiles, machinery, fans, etc., to provide all the background one wants — oftentimes a great deal too much of it.

A pair of coils should now be placed in the proper sockets. Be sure the detector and oscillator coils are not interchanged. Set the dial on the broadcast receiver to about 650 kilocycles; this is a convenient setting and ordinarily not so many regular broadcasting stations will be picked up directly at the low frequency end of the band. Also, tuning is more spread out at this end of the scale on many broadcast receivers. If a local station is near this frequency it may be impossible to cut it out completely, even though the antenna is transferred to the converter and is not connected to the receiver itself. The object is to pick out a quiet section of the band where the possibilities of direct pick-up are minimum, and set the dial in about the middle of it.

Now set the dial on the converter (oscillator tuning) to about the center of the scale. The right-hand knob (regeneration) should be set so that about half the resistance is in the circuit. Now turn the left-hand knob (detector) slowly from zero to full capacity and note whether the background noise comes up to a maximum at any point. In the event that there is no response with the background supplied, several things may be wrong; but to avoid interrupting the tuning story, possible sources of trouble will be considered later on.

For the present we will assume that a definite point of maximum background has been noted on the detector tuning.

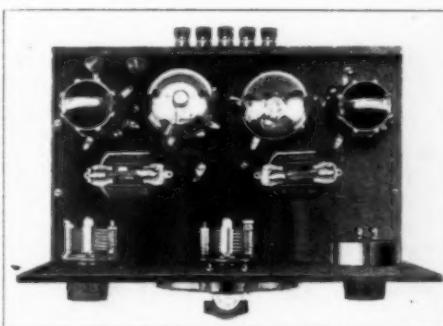
The right-hand knob (regeneration control) should now be advanced until the volume is maximum. It probably will be necessary to make a slight readjustment on the oscillator dial as this control is varied; a little experimenting will readily indicate which setting gives the best results. It may be found that as the setting is advanced a point will be reached where there will be a loud roaring noise set up; this is the result of too much regeneration, and the knob should be set below this point.

The next step is to begin a search for signals. The oscillator dial should now be turned very slowly, the first detector knob being varied at the same time. The importance of doing this searching very slowly cannot be stressed too greatly, because it is easily possible to miss even a very loud station entirely by too rapid tuning. A dial with a high vernier ratio is useful on the oscillator condenser. The other two controls are not at all critical.

The oscillator tuning condenser covers a considerable range of frequency, and it may be possible to pick up the same station at two different

points on the dial, depending upon the intermediate frequency to which the broadcast receiver is adjusted. In such a case the setting of the oscillator condenser which gives the best volume should be chosen. The first detector setting will be the same in either case.

Now turn the attention to the broadcast receiver. If, as most of them are, it is a single-dial affair, it will be very easy to cover a 1000-ke.



LOOKING DOWN ON THE CONVERTER

band by simply turning the dial as if tuning in ordinary broadcast stations. If a group of stations has been heard previously when searching as described above, that same group will appear on the receiver dial just the same as they did on the converter dial but they will not be nearly so crowded, and tuning them in will be much easier. Although it is possible to listen with perfect satisfaction without again touching the converter after preliminary adjustments have been made, it is sometimes advantageous to reset the first-detector knob slightly in order to bring the volume up to the very maximum.

Once set up correctly and adjusted, the converter and broadcast receiver form a really sensitive short-wave super-herodyne, and the results are just as good as would be obtained from a short-wave super built especially for the job and using a comparable number of tubes. In spite of the fact that the time for trying out the device has been limited, the preliminary results convince us that, with proper handling and reasonably decent receiving conditions, it should be possible to pull in distant stations with ease.

The set used in the tests was an Atwater-Kent Model 55 chassis, with the A-K dynamic speaker. This particular model has two screen-grid r.f. amplifiers, and although it has plenty of gain, it is possible that a receiver with a well-designed three-stage r.f. end would be more sensitive. Separate plate and filament supplies were used on the converter, because only the stronger stations would come through when the first r.f. tube was removed from the receiver to allow a plug to be used. The converter has since been given a trial on other popular models of receivers with uniformly better success when the plug is

not used. As expected, however, the plug works out fairly well with sets which have more than two stages of r.f. amplification.

AMATEUR WORK

The set had a real kick on short-wave amateur and commercial signals. Since beat-note reception was impossible without a separate heterodyne, all signals were received at first on their modulation only and how some of those raw a.c. and rough r.a.c. signals did show up! We got a big

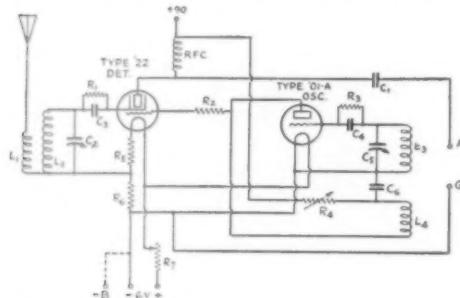


FIG. 3.—THESE CONNECTIONS ARE USED WITH D.C. TUBES

R_5 —10 ohms.

R_6 —5 ohms.

R_7 —20-ohm rheostat.

All other constants same

as in Fig. 1.

—B post not used in most cases as this connection has already been made in most B/C receivers.

kick out of watching the diaphragm of the speaker do tricks when some high-powered commercial station was tuned in "on the nose." Both domestic and foreign commercials had so much pep that the signal could actually be "felt" by holding the hand in front of the speaker, because the piston was moving almost a quarter inch and produced a considerable blast of air. It was impossible to be heard in the lab while speaking in an ordinary tone of voice when such a signal was on — we had to shout in each other's ears. (Some of the Directors, who were in Hartford for the annual meeting at the time, will attest to this.)

Although it is possible to get some extremely loud signals and the selectivity is all that could be desired, there are a few difficulties attendant upon the use of such a receiver as a telegraph outfit. In order to get beat note reception it is necessary to use a separate heterodyne, and to use the tuning system outlined above would mean the addition of another variable tuning control. Of course it is possible to do all tuning with the oscillator, and use a fixed intermediate frequency with a fixed heterodyne to set the beat note. In such a case the usual band-spreading tactics would have to be applied to the coil and condenser in the oscillator circuit. The beauty of the variable intermediate frequency is that the speed of tuning is exactly the same no matter what frequency the converter may be tuned to, and therefore all amateur bands can be spread on the dial in pro-

portion to the actual number of kilocycles each band covers. A three-circuit broadcast tuner hooked up in a single-tube regenerative circuit with a wire run from the antenna post on the tuner to the ground post on the broadcast receiver will provide a satisfactory separate heterodyne. The pick-up will be sufficient to give a good beat note on c.w. signals.

The combination is a mighty good amateur 'phone receiver, possessing the selectivity required for operation in a crowded band, and providing a real audio amplifier for ham 'phone signals. With an outfit of this sort it is easy enough to find out whether a 'phone really "sounds like a broadcast station," because it is possible to compare the two directly. It is axiomatic that anything which can be heard on the 'phones with an ordinary short-wave receiver can be heard on the speaker with a super because of the greater amplification, and it really works out that way. Maybe if the neighbors can hear both sides of the conversation they won't think friend ham has gone daft and talks to himself constantly.

This, we think, is the most pertinent application of the converter to amateur radio, aside from the pleasure which many of us get from listening to short-wave broadcasts and DX hunting now and then. The operation of such a receiver is quite in contrast to the usual short-wave receiver, in respect to both selectivity and quality of reproduction.

SHORT-WAVE BROADCASTING

Naturally the converter is eminently suited for short-wave broadcast reception. If the same values of condensers have been used as specified in Fig. 1 and the coils are also exactly as per specifications, the tuning should be fairly close to the dial settings which have been logged on the set shown in the photographs.

With the pair of coils for the 6000-ke. band, a station should appear somewhere between 40 and 55 on the center dial if the broadcast receiver is set to 650 kc. The left-hand knob will be set at about half capacity. If such a station is heard, pass by it for the time being and see if there are any more near it. This particular band is 150 kilocycles wide, and it is usually possible to hear three or four stations working in it in the evening. If several stations are picked up, select the one nearest the center of the group, and then make a record of the oscillator dial setting for that station. This dial setting becomes the key setting for the band, and no further tuning is done on the converter itself except perhaps to make a small adjustment on the left-hand knob now and then as different stations are tuned in.

The other sets of coils are treated in just the same manner. The other broadcast bands are not always as well populated as the 6000-ke. band, but it is usually possible to hear some stations on 9500 and 11,800 kc. The 15,100- and 17,750-ke.

each tuner circuit in the receiver dyne, beat amateurly re- and phone easy really it is axio- in the receiver use of s out both friend antly. plica- from ening now ever is the re- quality

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bands seem to be used mostly for daytime broadcasting, and at times it is impossible to find any signs of activity on them. The four bands last named are the ones on which foreign stations are most likely to be heard, the first for night reception, the second for afternoon and early evening, and the last two for daytime or late night transmission over great distances.

One of the great disadvantages of short-wave broadcast reception is rapid and drastic fading. The newer broadcast receivers with automatic volume control are therefore particularly suited to this work, because the intensity will be maintained at approximately the same level.

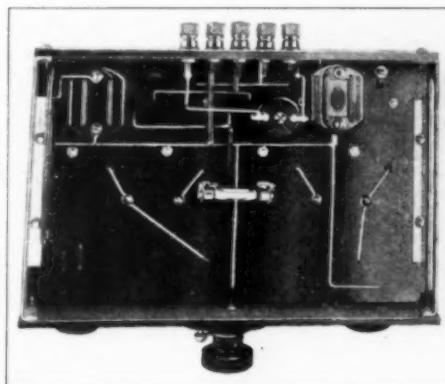
Receiving conditions at A.R.R.L. Headquarters are far from ideal, with two car-lines and an electrical manufacturing plant within a few hundred feet of the "lab," to say nothing of small machinery which is constantly running in various parts of the same building. The street on which the offices are located is likewise a well-travelled one, and at high frequencies the noise from ignition systems of trucks and automobiles is particularly bothersome. For this reason a good part of the time available for experimenting was taken up with simply waiting for some especially virulent machine to let up so something besides noise could be heard. In addition, the broadcast receiver with which the experiments were made was ours for only three days, being borrowed from one of the local radio stores. Therefore, it is not possible to say with any certainty just what can be expected in the way of distant reception.

However, in the moments when it was possible to listen with some degree of comfort, a number of broadcast stations within a thousand miles or so on the 6000-ke. band were picked up in the afternoon and early evening with volume which was considerably more than ample — in some cases it was impossible to turn the volume control fully on without overloading the audio system. On 9500 ke. PCJ was picked up in late afternoon with fairly good volume, increasing in intensity later in the evening, and except for fading was as loud as stations are ordinarily allowed to become in a home. The following morning a foreign station was heard on the 17,750-ke. band with fair intensity. One or two other stations were also heard on the higher-frequency bands, but lack of time or recurrence of noise prevented identification. Several of the transatlantic telephone stations, both English and American, were picked up on various frequencies at different times of the day. Reception was of course all on the loud-speaker. We would hesitate to put a pair of phones on the output of a modern broadcast receiver.

HUNTING TROUBLE

During the cut-and-try period of construction, a number of things happened which weren't quite as they should have been. Unearthly shrieks and

howls, roars and grunts frequently rent the air, much to the disgust of persons nearby who were trying to keep their minds on their work. Bursts of music and the machine-gun rattle of tape transmitters rewarded the efforts of the experimenters now and then, but added nothing to the enjoyment of the unwilling audience.



UNDERSIDE OF CONVERTER

However, a number of things were learned, and since others are quite likely to have the same troubles a few hints as to cures will be given. We are quite certain that the possibilities of the device as a noise-creator have not been fully probed, but a number of sources of trouble have been analyzed.

The commonest source of trouble is too much regeneration on the oscillator, which has been mentioned previously. As the regeneration control is advanced a point will often be found where a loud mushy roar starts, which is simply an audio frequency oscillation caused by too high plate voltage on the oscillator tube with that particular coil. The remedy is quite obvious, but there is a tendency for the howl to lag so far as settings on the knob are concerned. In other words, the roar stops when the regeneration control setting is considerably lower than the point at which it started. It may happen, particularly when the plates of the oscillator condenser are very nearly completely unmeshed, that it will be impossible to keep the howl from breaking out at inopportune moments. This indicates that the tickler winding, L_4 , on the oscillator coil, is too large, and removing one turn will probably help a great deal. It is well to be cautious in removing tickler turns, because the operation of the oscillator at the upper end of the condenser scale may be adversely affected.

If nothing can be heard at any setting of the converter dials and knobs, any one of a number of things may be wrong. The chances are ten to one that some mistake has been made in the wiring or some connection has been omitted. One or both

of the tubes may be defective. All connections should be checked carefully, and then everything should be scrutinized very critically with the idea of showing up poor workmanship, joints in wiring which only apparently make connections, and poor judgment in laying out the r.f. parts of the circuit. The latter point is probably one of

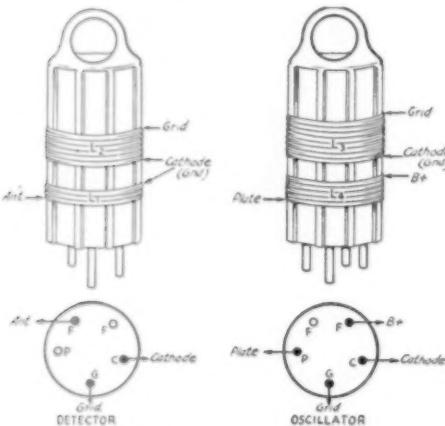


FIG. 4.—ARRANGEMENT OF THE COILS AND COIL SOCKETS

Only the connections on the sockets marked with the solid black circles are used.

the most important. We have seen any number of attempts at set construction which were enough to disgust an experienced radio constructor, and yet the builders seemed to be sincerely laboring under the impression that it was "exactly like the one in *QST*." At least they said so. If you are inexperienced in such matters, *follow the photographs carefully*.

If, after checking as suggested above, there is still no sign of activity, and other tubes have failed to give results, it is probable that the oscillator is not functioning. In order to test for oscillation, a milliammeter should be connected in series with the negative "B" lead to the converter, and the oscillator grid leak touched with the finger. If the oscillator is working the plate current will increase when the grid is touched; if it is not, nothing will happen. If a milliammeter is not handy a pair of 'phones may be connected in series with the plus B lead and the same test applied, in which case a healthy click will be heard both when the grid leak is touched and when the finger is removed. Touching the side of the leak which is farthest from the grid of the tube will give the most positive results.

If the test shows the oscillator is not working, the coils should be looked over carefully to make sure that the connections have been made as in Fig. 4, and that all coils have been wound in the same direction. This latter point is probably the cause of non-oscillation. The coils must be wound

in the same direction and the connections brought out as shown if the oscillator is to work. Other grid leaks and coupling resistors should be tried if all else fails. Finally, if nothing is found wrong with the coils or leaks, it may be that the oscillator tube or the layout is such as to require a few more turns on the tickler winding, L_4 .

A series of chirps as either the oscillator dial or detector knob is turned indicates that the first detector is oscillating. This point can easily be settled by touching the grid leak on the first detector with the finger, and no further chirps will be heard as long as the finger is held on the leak. The detector seems most likely to break into oscillation when its tuning condenser is at about minimum capacity, and so long as it does not oscillate near where the desired stations are heard, there is no particular harm done. However, it may be aggravating at times, and can usually be stopped by either reducing the setting on the oscillator regeneration control or by decreasing the coupling between the two tubes, which requires a higher value of resistance at R_2 . Increasing the value of R_2 may also decrease the signal strength on the higher-capacity settings of the oscillator and detector tuning condensers; all these factors should be taken into account in making a permanent adjustment.

With the receiver used in the tests, it was found that a particularly strong signal would cause a howl to build up if the volume control on the broadcast receiver were advanced too far. This howl did not seem to be assignable to the receiver or the converter separately, but was probably a result of interaction between them. Setting the volume control at a lower value or a slight readjustment of the detector tuning or both, will nearly always cure it.

Hum is likely to be non-existent or bad, depending upon individual tubes. Ordinarily no trouble of this kind is encountered with the first detector, because hum does not become bothersome until a tube is oscillating. Since the first detector is not allowed to oscillate it was not anticipated that any trouble would be had with hum from it, and such has proved to be the case. The oscillator, however, cannot be so lightly pushed out of the picture. Some tubes will work with perfect satisfaction, introducing no more hum than is already present in the broadcast receiver itself; others are not so considerate. Out of some eleven tubes tested, nearly all of different makes, three were perfectly humless, five had a noticeable hum only when the volume control on the receiver was near maximum, with two the hum was somewhat more noticeable than with the other five, and one out of the eleven had a really bad hum. Grounding the filament transformer, either through a resistor or condenser, seemed to have no effect whatever, so that the conclusion naturally presented itself

(Continued on page 80)

A Compact and Inexpensive Chemical Rectifier

Applying New Ideas to Electrolytic Rectifier Design

By George S. Parsons*

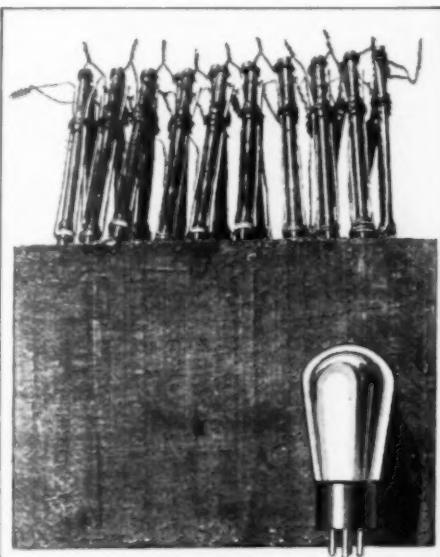
HERE is a widespread belief among amateurs of to-day that the chemical or electrolytic rectifier, as applied to high-voltage rectification, is greatly inferior to other types. There is a number of reasons for this belief, among them the fact that the usual amateur set-up is very messy, occupies a considerable space, and requires a transformer of generous proportions for successful operation. It must be admitted that a set-up of twenty-four pint Mason jars, coated with a greasy scum, is not beautiful to look upon, especially when it is compared to the compact and neat-appearing tube rectifiers. It is the purpose of this article to describe a chemical rectifier which meets these objections; it is highly compact, neat in appearance, and reasonably efficient.

In the April, 1929, issue of *QST* there appeared the first part of an article on rectifiers by R. J. Kryter.¹ Lest it appear that I am attempting to parade the ideas of others as my own, I wish to state that it was this article which gave me the fundamentals with which to work. Mr. Kryter reviewed in detail both the theory and the design of rectifiers, and gave an excellent discussion of the needs of the chemical rectifier. A brief review of his findings is therefore in order.

Kryter states that if an electrolytic rectifier is to function properly, certain conditions must be fulfilled. These conditions deal with purity of electrode material, current density, shape and size of electrodes, and types of solutions.

It appears that one of the most important of these conditions (and one which is least often properly taken care of) is the matter of current density. For an active electrode of pure aluminum, Kryter states that the current density should be *not less* than fifty milliamperes per square inch of active aluminum surface. Thus if a sheet of aluminum having an area of one square inch on one side is totally immersed in the solution, the current density should be *at least one hundred milliamperes*. The total active area of the above plate is two square inches, and a load of one hundred milliamperes would give the required current density of fifty milliam-

peres per square inch. With special cooling methods much higher current densities may be used, densities as high as 2500 milliamperes per square inch being permissible. At this point I should like to bring to attention this fact: Practically all the articles which have appeared in *QST* specify that the current density should be *kept below* forty milliamperes per square inch,



THE CELLS AND CONTAINER FROM ONE SIDE
The small size of the complete rectifier can be judged by comparing it with the receiving tube.

and this figure is given in the *Handbook* as well. In view of the later work which has been done on the aluminum rectifier, however, the current density specification should be made *at least* fifty milliamperes per square inch of active surface.

Other conditions of considerable importance are as follows: The aluminum electrode should be constructed of the purest metal obtainable; it should have a polished and well rounded surface in order that the potential gradient be uniform over the entire electrode. The solution

* 2717 Derby St., Berkeley, Calif.

¹"Alternating Current Rectification as Applied to Radio," *QST*, April and May, 1929 (in two parts).

should consist of certain organic acids and their salts dissolved in pure water. Sodium bicarbonate or borax may be used but will not give the excellent results obtainable with an organic solution.

Let us now consider the theory of design of a small chemical rectifier. Assuming that the rectifier will be used to supply one or two Type '10 tubes, we may draw the following conclusions.

If one tube is used, the plate current will be sixty to eighty milliamperes, depending on the

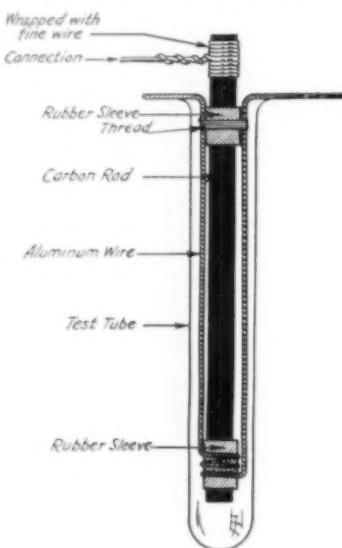


FIG. 1.—ONE OF THE NEW TYPE RECTIFIER CELLS

The active electrode is No. 14 pure aluminum wire and the inert electrode is the carbon rod from an old "B" battery cell. Twenty-four of these cells in a bridge will rectify 750 volts a.c. (r.m.s.) and deliver at least 100 ma. for a pair of Type '10 tubes.

adjustment of the circuit and the voltage applied to the tube. The transformer voltage will probably be anything from five hundred to eight hundred volts, depending on the transformer available. Aluminum, used as the active electrode, has a definite operating voltage which should not be exceeded. If an organic solution of the proper type is used, an operating voltage of 160 volts per cell is permissible. In the bridge type of connection, one-fourth of the cells must withstand the entire secondary voltage when in the closed valve position; thus a bridge-connected rectifier consisting of twenty-four cells will operate without danger of overload at a voltage as high as 960 volts (r.m.s.).

It has been stated that the aluminum electrode should have a polished and rounded surface and that sharp corners should be avoided. Perhaps the easiest way to realize this is to use aluminum

wire as the active electrode. Aluminum wire of No. 14 gauge has a diameter of 0.064 inches. The area of the surface of the wire is given by the expression πDL , where D is the diameter of the wire and L the length. πD is 0.201 inch: The wire has a surface area of 0.201 square inch per linear inch. Since the current density must be not less than fifty milliamperes per square inch, not more than 1.8 square inches of aluminum should be exposed to the solution. If the rectifier is to be used on very light loads (60 milliamperes or less) the area should be even less, about one square inch being suitable. Assuming that a load of at least one hundred milliamperes will be drawn, the value of 1.8 square inch should be used, and may be obtained by immersing at least nine inches of the aluminum wire in the solution. Allowing three inches for connections, the wire should be cut in twelve-inch lengths.

Since organic solutions are to be used, carbon is probably the best suited for use as the inert electrode, and may be easily obtained from an old "B" battery. Carbon rods obtained from this source should be carefully cleaned in boiling water. This will remove the ammonium chloride and other impurities which may be present on the rods.

It is always desirable, in a cell of this sort, to reduce the resistance to a minimum. To do this the electrodes should be mounted as close to each other as is possible. Five millimeters (about 0.2 inch) is a convenient distance. It is not advisable to mount the electrodes closer than this, since with changing temperature some of the organic salts present in the solution may crystallize out around the electrodes and cause erratic performance.

In place of the usual pint Mason jars or drinking glasses, test tubes were used as containers. Test tubes are small, cheap, easy to obtain, and may be mounted in a small box, thus providing a very compact and neat arrangement. Following this design the rectifier described below was built.

The rectifier network consists of twenty-four cells. The containers are test tubes, six inches in length and seven-eighths inch in diameter. The tubes are mounted in two rows in a wooden box, twelve inches long, two inches wide, and sufficiently deep so that only the rims of the test tubes are above the top of the box. The tubes are held in place by pouring molten paraffin around them.

The electrodes were made as follows: Carbon rods of approximately four-inch length were obtained from an old "B" battery. These rods were thoroughly cleaned in boiling water and dried. Short pieces of rubber tubing of sufficient diameter to fit snugly to the carbon rod were pushed over each end. At the top, sufficient carbon was left exposed to make a connection. A piece of aluminum wire of No. 14 gauge was then led down the side of each rod: two and one half

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turns were made about the lower rubber sleeve, and the wire led back up along the opposite side of the rod.² The aluminum wire was then secured to the upper rubber sleeve by means of a few turns of a thin twine. Connections to the carbon rods were made by wrapping the ends of the rods with several turns of bare copper wire of No. 24 gauge, and soldering a short piece of No. 16 bare copper wire to the wrapping of No. 24 wire. The drawing, Fig. 1, illustrates the design.

The electrodes were placed in the tubes and connected in the usual bridge form. An organic solution³ was poured into the cells and the rectifier was connected to the secondary of a transformer of five hundred watts input, the secondary voltage being 750 volts (r.m.s.). The time required for forming was approximately one minute and the leakage after this time but a few milliamperes.

As Kryter states, the performance of the usual chemical rectifier is limited by the heat developed in the solution. As the solution undergoes a rise in temperature, the working voltage decreases. More explicitly, the leakage effects increase with increasing temperature, finally reaching a point where the rectifier ceases to operate and acts as a dead short on the high-voltage supply line. Assuming that the rectifier will always be operated at or below the rated working voltage, the point at which the rectifier suffers complete break-down depends upon the ratio of heat developed to heat radiated. If the rectifier is capable of radiating heat as rapidly as heat is produced, regardless of current, exceedingly high currents could be drawn without overloading the rectifier. In actual practice any rectifier has a definite current rating which may not be exceeded without overheating. This limit is set by the construction of the rectifier. For example, the one described in this paper has the cells imbedded in paraffin, which is a rather poor radiator of heat. Thus the maximum permissible load is not large — probably not over 250 milliamperes for short periods.

In any electrolytic cell through which an electric current is flowing, energy is being dissipated in the form of heat and in electrolysis of the solution. The electrolysis may be accompanied by certain chemical reactions which may either liberate or absorb heat, depending on the exact nature of the reactions. In order to determine the relation between these two values, the following experiment was carried out.

A direct current was sent through a single cell consisting of one of the electrodes described above immersed in 600 ccs. of the solution in a large Dewar flask. Knowing the specific heat of the solution, the amount and duration of current

flow, and the resistance of the cell, the heat developed due to the resistance of the solution could be calculated from the expression, $H = I^2 R/4.187$. Measuring the rise in temperature by means of a Beckman thermometer and calculating the total heat developed, it was found that for a given current flow the experimental value

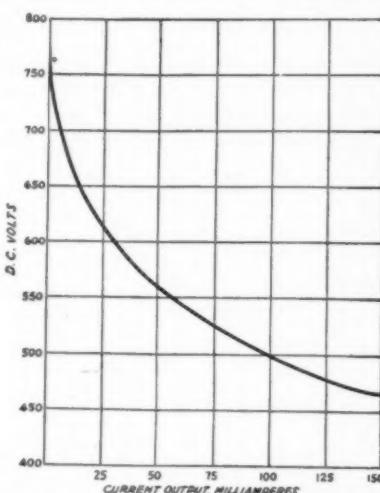


FIG. 2. — VOLTAGE REGULATION CURVE OF THE RECTIFIER

The transformer secondary voltage is 750 (r.m.s.) and the load is a pure resistance.

corresponded very closely to that calculated. This means, of course, that whatever heat may be absorbed or given out by the chemical reaction going on within the cell is small in comparison to the heat developed by the resistance of the cell to the current flow. If we calculate (on the basis of the above data) the heat developed in the rectifier network described above, with a load of 200 milliamperes, it will be found that a rise in temperature of 0.115 deg. C. might be expected. It will be shown that this value is very much too low.

Let us now consider the rectifier under actual operating conditions. Suppose the output to be 500 volts at a load of 100 milliamperes. Assuming an overall efficiency of 50%, the total input to the rectifier is 100 watts and the loss in the rectifier must be 50 watts. With about 20 cc. of a solution having a specific heat of 0.85, this would cause a rise in temperature of about two degrees C. per minute. However, since a great amount of this energy lost in the rectifier is spent in causing chemical action within the cells, the heat actually developed is much less than the value given above. It was found by experiment that the rise in temperature under the above conditions was not two degrees but was slightly less than one degree, the exact value depending somewhat on the room temperature. Inasmuch as the

² If shorter rods are used, more turns of aluminum wire should be wound around the lower rubber sleeve. — *Editor.*

³ The formula for the electrolyte is given at the end of this article. — *Editor.*

load on a chemical rectifier being used to supply a small high frequency transmitter is usually intermittent rather than steady, and since a certain amount of heat will be radiated from the cells, the rise in temperature will vary considerably for different set-ups. The reason for the error in the value for rise in temperature, calculated

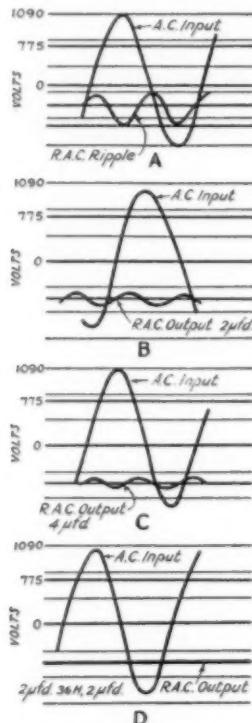


FIG. 3.—OSCILLOGRAPH RECORDS OF THE RECTIFIER'S PERFORMANCE

"A" is without any filter in the output; "B" is with $2 \mu\text{fd}$ across the output; "C" is with $4 \mu\text{fd}$; and "D" is with a filter of $2 \mu\text{fd}$, 36 H. and $2 \mu\text{fd}$.

from the d.c. values for a single cell and applied to the network, is probably that the formation and breaking of the film by the alternating current involves losses which are not encountered with a steady current flow. The particular network with which the above tests were made has been used to supply an intermittent load of 100 milliamperes at an input voltage of 750 volts, for several hours. No appreciable heating could be observed.

The efficiency of the rectifier was found to vary with the conditions of the test and the load drawn. It appears that temperature has a great deal to do with the efficiency, it being advisable to operate at a low rather than a high temperature. Although the cells will operate at temperatures above 35 degree C., it is much better to keep the temperature below 20 degree C. A room

temperature of 68 deg. F. corresponds to a temperature of 20 deg. C., hence room temperature is a convenient point for satisfactory operation. As a matter of fact, the rectifier will probably not show a rise in temperature of more than three to five degrees above the temperature of the room, assuming a normal load of 100 milliamperes and intermittent operation. The power efficiency usually will vary from 40% to 50% and at light loads the efficiency probably will not be more than 40% of the input. Although this may seem to be low efficiency, it should be kept in mind that the maximum over-all effi-

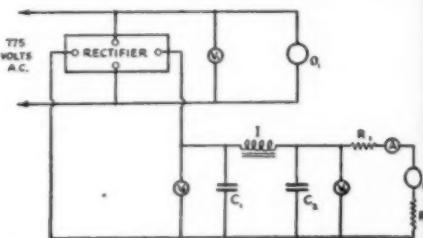


FIG. 4.—THE CIRCUIT USED IN MAKING THE OSCILLOGRAPH RECORDS

V₁—A.c. voltmeter, 0-1000 volts.
V₂—D.c. voltmeter, 0-1000 volts.
L—36-henry choke.
C₁ and C₂—2-μfd. filter condensers.
R₁ and R₂—Resistors.
A—Milliammeter.
XX O₁—Oscillograph element for a.c. rectifier input.
O₂—Oscillograph element for d.c. rectifier output.
A.c. input voltage, 775 volts; d.c. output voltage, 607 volts; d.c. output current 57 ma.

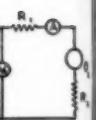
ciency for a perfect rectifier is 81.2%. This follows from a consideration of the geometric properties of the sine curve.

In determining the output voltage and load it should be remembered that the greater the load up to a certain point, the greater the voltage drop across the rectifier; with an input voltage of 750, a load of 50 milliamperes may give an output voltage of 600 volts or more; a load of 100 milliamperes will probably reduce the voltage (output) to about 550 or less. The exact value may be obtained from the curves given in Fig. 2.

The ease with which a rectifier of this type forms is remarkable. It may be connected directly to the high voltage supply without danger to the transformer windings. There will be a very large current drain lasting for a matter of seconds after which the current falls very rapidly; the rectifier is formed completely in three minutes. This short time of formation is in sharp contrast to the time required for rectifiers having large aluminum plates and a borax solution, the time of formation for the latter often being a matter of hours rather than of minutes.

There are at least three reasons for the rapid formation of this rectifier: The aluminum us-

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is very pure and has a polished surface; the area of the aluminum plate is very small; and the solution is of complex organic compounds rather than the simple inorganic salts such as sodium bicarbonate or borax. Of these reasons, the first two are probably more important than the last, and the matter of electrode area is probably the most important of all.

For example, Holler and Schrot have found that an area of one square centimeter forms almost at once, whereas an area of three hundred square centimeters requires several hours for complete formation. In the first case, twenty-five volts were used for forming and in the second, 120 volts were used. This might be interpreted in one of two ways; either the cell forms less rapidly with the higher forming voltage or some minimum value of forming current per square centimeter of aluminum is required. I am inclined to believe that the latter is correct for this reason:

If two aluminum cells are set up — one having an active electrode area of one square inch and the other an active electrode area of fifty square inches and a direct current is applied to each cell, it will be found that the small cell forms in a few minutes while the large cell requires a much greater time.

In this case equal potentials are applied to each cell and the same current flows through each. This condition, while theoretically impossible, may be closely approximated by making the internal resistance of the two cells as nearly alike as practicable. This may be accomplished by spacing the plates of the small cell very closely and the plates of the large cell some distance apart. Since equal currents are flowing through each cell, it follows that the current density is much less in the large cell than in the small one, thus making it appear that a minimum forming current is required.

The solution employed in this rectifier is one given by Kryter and has the following formula and operating characteristics:

Formula:

Ammonium citrate	425 gms.
Citric acid	368 gms.
Ammonium phosphate	150 gms.
Potassium citrate	8 gms.
Distilled water	1,000 gms. (cc.)

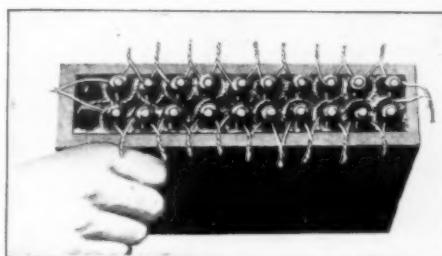
Operating characteristics:

Working voltage, r.m.s. . . .	160 volts.
Breakdown voltage, r.m.s. . .	210 volts.
Critical temperature	120 deg. F.
Useful life of 100 cc. of solu- tion	69 ampere hrs.

In the rectifier described, each cell contains about twenty cc. of solution. With a d.c. load of 100 milliamperes this means an operating life of at least 175 hours.

It is possible to use other solutions in the rectifier than the one just given. The operating characteristics, however, will vary with the solu-

tion. Either borax or baking soda may be used, but in such cases the maximum working voltage will be less than 160 volts per cell. Furthermore, it must be remembered that the life of a simple, inorganic solution such as borax is much less



A TOP VIEW OF THE COMPLETED RECTIFIER

than that of an organic solution, thus necessitating more frequent change of the solution.

Since the first part of this article was written, the rectifier output has been checked with an oscilloscope, the records being shown in Fig. 3. The output wave shows complete rectification, being totally above the zero axis. As might be expected, since the internal capacity of the cell used as a unit is low, any smoothing effect in the rectifier itself is very small. This may be seen in curve "A". With the output fed into a condenser, a distinct smoothing effect is evident. This becomes more pronounced as the capacity is increased. "B" shows the effect of connecting a 2- μ fd. condenser across the output side of the rectifier and "C" shows the effect of four microfarads. The addition of a choke of 36 henries gave (at least as nearly as the oscilloscope could show) pure d.c., the trace being a straight line. The circuits used are shown in Fig. 4.

The results obtained with the oscilloscope make it quite evident that there is no excuse for not obtaining pure d.c. with a reasonably small filter; certainly a filter consisting of a 36-henry choke shunted on each side with a 2- μ fd condenser is not an elaborate filter system.

A load of 54 milliamperes was on the d.c. output at all times, and the rectifier was permitted to operate constantly for a period of two and one-half hours. Slight heating was observed, the temperature rising to about 100 deg. F. This emphasizes that the rectifier is capable of handling intermittent loads well in excess of 54 milliamperes, 100 or more milliamperes being permissible under ordinary operating conditions.

Strays

After the recent broadcast from W1MK about the new regulations one chap wrote in and wanted to know about the new 30- and 60-meter bands! Of course "mc." and "mtr." do sound a bit alike.

The Annual Meeting of the A.R.R.L. Board

By K. B. Warner, Secretary

THE Board of Directors of the American Radio Relay League held its annual meeting in Hartford, on May 2d and 3d, under the chairmanship of President Maxim. These annual meetings are the most important affairs in government of our League, for here the directors assemble from all over the country and for two days exhaustively examine the work of the A.R.R.L. and make new plans based on their nation-wide study of conditions and members' desires. All sixteen of the directors, whose names appear each month on page 6 of *QST*, were present except Mr. Babcock from the Pacific Division, who was ill but who sent as his alternate Mr. Foster G. Strong, W6MK, of Long Beach, California. The headquarters officers of course were also in attendance.

After the roll call and the approval of the minutes of its previous meeting the Board proceeded at once to the hearing of reports. Each of the officers presented a comprehensive report on his stewardship of certain branches of A.R.R.L. affairs, telling of the work of the past year and making recommendations for the future. The General Counsel of the League similarly reported. The Canadian General Manager and each of the division directors presented a report on the affairs under his jurisdiction, how the members feel about this and that, the troubles encountered, the new ideas suggested. All these reports the Board heard and accepted, and listed the topics brought up for careful consideration.

Mr. Maxim and Mr. Stewart were unanimously reelected president and vice-president, respectively, for 1930 and 1931. There were no other names in nomination.

The Board examined and ratified the acts of the Executive Committee in the past year, appropriated funds for the expense of the annual meeting, sent a telegram of good cheer to Mr. Babcock, regretting his absence, and then tackled its first knotty problem.

OUT-OF-BAND OPERATING

This first problem was a study of ways and means to confine amateur operation to the authorized bands, a subject which every active amateur knows to be a vital one right now. Much thought was given to the establishment of marker signals on the limits of each band, to increased standard-frequency transmissions and to other practical aids of similar nature. Because any such program to be successful must be based on sound technical plans, this part of the subject was referred to the Executive Committee for further

study. It developed that there was general sentiment amongst the members that there was no excuse for most off-wave operating, that for the most part it was inexcusable carelessness, and that there was widespread demand amongst the great law-abiding majority of amateurs that the Government do something about it. Somewhat to the surprise of each other, every director reported that the amateurs in his division were united in urging a drastic enforcement policy, with the suspension of licenses as the penalty for violation, provided, of course, that guilt is established. It was the nation-wide sentiment that it was time to do something, that the rights of the majority must not be jeopardized by the carelessness of a few, and that the job was up to the Department of Commerce as the radio-policing agency of the Government. Accordingly, the Board unanimously voted to advise the Department of Commerce, Radio Division, that it is the desire of the League that the Secretary of Commerce comply with Section 5(D) of the Radio Act of 1927, as amended, by immediately putting into effect the policy of suspending the operator's licenses of all persons consistently violating the regulations of the Commission by operating outside the frequency bands prescribed for amateur services. It also instructed that in all cases where the Communications Department of the League acquires evidence satisfactory to it of consistent off-wave operation, the Communications Manager shall forward such evidence to the Secretary of Commerce with a specific request for suspension of operator's license. With the new monitoring station of the Radio Division in Grand Island, Nebraska, and the new equipment at each district headquarters, disciplinary suspensions should now be expected by the persistent violators.

'PHONE OPERATION

As at the two previous meetings, the question of 'phone operation came in for a good share of the Board's attention, and, like the previous meetings, not only was the problem acted upon the first day of the meeting but it was taken up for reexamination the second day and again carefully scrutinized. The Board had before it two petitions from 'phone men asking the League to sponsor a widening of the 3500-ke. 'phone privilege. It had counter requests from C.W. men that 'phone be moved to the high-frequency end of that band, to utilize the harmonic-family then made available for three-band crystal-controlled C.W. operation. 'Phone operators interested in this general sub-

ject are requested to see this month's editorial page, where it is more fully discussed. The overwhelming majority of amateur sentiment, as collected in each division by the directors, was against any widening of the band but in favor of a regulation which would require more ability of the 'phone operator, because 'phone is admittedly a much more complex art than C.W. Such a policy would confine 'phone operation to the men who know something about it and, by eliminating the unqualified operators, would increase the effective range of the facilities available for men who have the knowledge and the equipment to do real 'phone work. Thus the Board unanimously voted to seek no extension in the telephone range now, to leave it where it is, and to seek the creation of an amateur telephone operator's license, to be required for all amateur telephone operation, the same to be given only to operators having at least one year's experience in the amateur operator's class or higher, and having special technical qualifications; in other words, to require for any 'phone operation about the same qualifications as are now necessary for the 14-mc. band. This view, incidentally, was heartily recommended by numerous experienced 'phone men.

INTERNATIONAL AFFAIRS

The Board unanimously voted that the League should undertake amateur representation at the next meeting of the C.C.I.R., at Copenhagen in 1931, and at the next conference for the revision of the international convention, at Madrid in 1932. Plans were made for a publicity campaign, international in character, to start a year before Madrid and having for its aim the production of a favorable background for amateur radio at that conference. Meanwhile it is hoped that the A.R.R.L. can assist the I.A.R.U. organization in solidifying its position in the international field, which should be of invaluable assistance at both of these conferences; and plans thereto were left with the Executive Committee.

The Board made an additional appropriation of funds to be drawn upon by the Executive Committee for furthering the membership development program which is now under way, based upon the beginner's booklet which has been mentioned in *QST*. The resumption of national conventions was again asked by the Central Division, but again turned down by the Board for the same reasons as in the past: that such affairs are never national in scope and that they cannot be "conventions" because, under our constitution, League business is handled by the Board and not at meetings of the membership; it reiterated the statement of policy adopted at the 1927 meeting and published in *QST* for April of that year. The editorial policy of *QST* was discussed, the salaries of officers reviewed, and a careful study made of the problem of better contact between directors and their members.

SOME AMENDMENTS OF BY-LAWS

Some changes were made in the by-laws affecting areas outside of continental United States and Canada. It was felt that such areas which are not governed by the domestic radio laws of the two nations in which the League is centered should not participate in the making of League decisions. So long as they are part of League divisions they do thus improperly participate, members there vote for director and are entitled to instruct the director, and in fact a member in such an area is eligible to stand for election as director even though he does not operate under United States or Canadian radio law. These areas were originally incorporated in A.R.R.L. divisions in the desire to extend the operating activities of the Communications Department to them, but in the process they became part of the whole administrative field of the League. A further problem arose from the fact that some of these areas are so distant that there has not been sufficient time for the casting of ballots in the election of directors.

In this consideration it was considered desirable to retain in the administrative area served by the League the Territory of Hawaii, the Territory of Alaska, and the Island of Porto Rico, because these are governed by our domestic radio law and are in fact parts of the inspection districts of the Department of Commerce. The Board so amended the by-laws, however, as to eliminate Newfoundland, Labrador, Cuba, the Isle of Pines and the Philippine Islands as parts of our A.R.R.L. divisions. It was desired, nevertheless, to retain these areas within the scope of the Communications Department, as has been requested by them, so a further amendment was made whereunder the operating territory of the Communications Department is defined as consisting of the A.R.R.L. divisions plus certain other territory attached to but not forming part of the divisions, as follows: Newfoundland and Labrador, attached to the Maritime Division; Republic of Cuba and the Isle of Pines, attached to the Southeastern Division; and the Philippines, attached to the Pacific Division. Thus there is no change in C. D. activities in these areas.

The date for the receipt of ballots in director elections was changed to December 20th instead of December 1st.

The one-year-old provision in the by-laws that a candidate for S.C.M. must be the holder of an O.R.S. appointment was repealed. Experience has shown that an existing S.C.M., by his control of the appointment of O.R.S.'s, has an unwarranted power over the selection of his successor, and in some cases it was being abused; so the provision was eliminated.

THE TEMPORARY CERTIFICATE

Many directors reported abuse, in their districts, of the temporary operator's certificate,

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New Two-Volt Tubes

THE R.C.A. Radiotron Company has recently announced the production of three new tubes, all designed to operate at the same filament potential, 2 volts. A general purpose tube, a power output tube, and a screen grid tube form the new series. The general purpose tube, known as the UX-230, and the screen grid tube, the UX-232, correspond approximately (in characteristics other than filament voltage and current) to the Type '01-A and Type '22 respectively. The power output tube has no approximate counterpart in the present smaller sizes of audio output tubes, but to some extent averages the characteristics of the present Type '12-A and '71-A.

THE UX-230

The new general-purpose tube is similar to the Type '99 in external appearance, but the elements are those of the Type '01-A reduced to an appropriate size to fit the envelope. The small standard base and pin connections are used. The tentative ratings and average characteristics of this tube are listed below. The corresponding characteristics of the Type '01-A are also given for comparison.

	UX-230	UX-201-A
Filament voltage	2.0	5.0
Filament current, amperes	0.06	0.25
Plate voltage (maximum)	90	90-135
Grid voltage (C-bias)	-4.5	-4.5 to 9.0
Plate current, milliamperes	2.0	2.5
Plate resistance, ohms	12500	11000
Amplification factor	8.8	8.0
Mutual conductance, micromhos	700	725

The approximate direct inter-electrode capacitances of the UX-230 are as follows:

Grid to plate	6 μ fd.
Grid to filament	3.5 μ fd.
Plate to filament	2 μ fd.

The tube is suited to all uses to which a Type '01-A may be put, either as a radio-frequency amplifier, detector, or intermediate audio amplifier.

THE UX-231

The UX-231 is designed "for use in the last audio stage only," and is capable of delivering a moderate amount of undistorted power output to the loud-speaker. In appearance it is exactly the same as the UX-230, the only noticeable difference in the construction being in the spacing of the grid wires. Tentative ratings and average characteristics of this tube are as follows:

Filament voltage	2.0 volts
Filament current	0.150 amperes
Plate voltage, maximum and recommended	135 volts
Grid voltage (C-bias)	-22.5 volts
Plate current	8 milliamperes
Plate resistance	4060 ohms

Amplification factor	3.5
Mutual conductance	875 micromhos
Undistorted power output	170 milliwatts

The approximate direct inter-electrode capacitances are the same as those given above for the UX-230.

When operated at the recommended plate voltage the grid bias should never be lower than the values specified above, since a lower bias will



THE UX-230

cause an increase in plate current which may adversely affect the performance of the tube. When used correctly the output may be fed directly into a loud-speaker of suitable impedance without the use of an output transformer, since the plate current is comparatively low.

THE UX-232

The new screen-grid tube has about the same external appearance as the Type '22, but the construction of the elements is somewhat different, the control grid and inner screen grid being oval instead of cylindrical, and the filament is in the form of an inverted "V." The arrangement of the elements is shown in an illustration.

The average characteristics of the tube are listed below, together with the corresponding figures for the Type '22.

	UX-232	UX-22
Filament voltage	2.0	3.3
Filament current, amperes	0.06	0.132
Plate voltage, maximum	135	135
Grid voltage (C-bias)	-3.0	-1.5
Screen voltage, maximum	67.5	67.5
Plate current, milliamperes	1.5	1.5
Screen current	Not over $\frac{1}{4}$ of plate current	
Plate resistance, ohms	890,000	850,000
Amplification factor	440	300
Mutual conductance, micromhos	550	350

The effective grid-plate capacitance of the UX-232 is 0.02 μ fd., maximum.

(Continued on page 82)

Official Frequency System Progress

Elgin Observatory to Succeed W9XL—W1AXV Schedules— New Marker Station System to be Inaugurated

SINCE the publication of the Official Frequency System news in May *QST* there have been important developments towards improving and expanding the League's frequency calibration service to amateurs. In addition to a change in administration of the System which centers the supervision at Hartford headquarters, a new standard frequency station has been appointed to succeed W9XL; prospects of a Pacific Coast station (to make the third and complete station for the S.F. net) are in sight; complete coordination of the operation of the whole system is being realized; and the Official A.R.R.L. Frequency Standard is expected to be in operation at Hq by the time this issue of *QST* is out.

THE NEW S.F. STATION

The League has been fortunate indeed in securing the co-operation of the Elgin Observatory of the Elgin National Watch Co. at Elgin, Ill., and in having this competent research organization accept appointment for the transmission of Official A.R.R.L. Standard Frequencies. The standard frequency station at Elgin will be in charge of Mr. F. D. Urie, W9SI, Director of Research. He will have as his assistant Mr. R. S. Neidigh, W9BEP. Both these gentlemen are active, dyed-in-the-wool hams, experimenters of the first water, and more than ordinarily capable of handling such little things as standard frequency transmissions of ultimate accuracy. The time determination facilities available at the Observatory are to play an important part in the precision radio frequency work, as might be expected, and contributions to ham radio additional to the standard frequency transmission can be expected from the fellows at Elgin.

The Elgin Observatory now has the experimental call W9XAM assigned for the transmission of time signals on 4795 kc. (see June *QST* for skeds) and there is a possibility that this call will be used for the S.F. transmissions also. The S.F. transmitter will be a 500-watt rig, monitored by a piezo frequency standard having an accuracy of better than .01%. The standard will be checked against the National Standard at the Bureau of Standards, Washington, prior to its installation at Elgin.

The setting up of a station for the transmission of standard frequencies is not something to be completed in a Saturday afternoon—the job is a precise one and requires some time. It is

hoped that sufficient progress will be made to allow publication of tentative schedules of W9XAM S.F. transmissions in the September issue of *QST*.

W1AXV ACTIVITIES AND SCHEDULES

Standard frequency transmissions, QRG service (see May *QST* for details) and official observing activities at W1AXV are going full blast. Howard Chinn, Paul Hendricks and the rest of the gang at Round Hill are hitting the ball right along—but not getting deserved cooperation from the fellows for whom they are giving the service.

W1AXV wants more reports. Such reports are necessary to show what areas W1AXV is covering with the various transmissions so that the proper times of day for different frequencies can be determined more exactly and also to assist in studies of skip distances, zones of reception and so on for the amateur frequencies on which the schedules are sent. Every time you use the S.F. transmissions of W1AXV, send in a report. To make the reporting easier, we have plenty of S.F. Report Blanks here at Hq. Just drop a card asking for them. They will be sent "no charge"—and postpaid.

All reports should be addressed to the Standard Frequency System, *QST*, Hartford, Conn. A notation of the report is made for our files and the original is then sent to the proper S.F. station.

If you are not making use of the schedules—for the love of Mike Henry use them! From now on the schedules will be published in every issue of *QST*. If you don't know how to calibrate your frequency meter, monitor, or what-have-you from S.F. transmissions, dig up K. V. R. Lansing's dope in September, 1929, *QST* (page 36) and find out how. It may mean saving your license from cancellation because of off-frequency operation.

Here are the schedules for W1AXV Standard Frequency Transmissions during July and August. Keep them on your operating table.

DATES OF TRANSMISSION

<i>Date</i>	<i>Schedule</i>
July 11, Friday	A
July 18, Friday	BB
July 25, Friday	B
July 27, Sunday	C
Aug. 8, Friday	A
Aug. 15, Friday	BB
Aug. 22, Friday	B
Aug. 31, Sunday	C

STANDARD FREQUENCY SCHEDULES

Time (p.m.)	Frequency, kc.		Time (p.m.)	Frequency, kc.	
	A	B		BB	C
8:00	3500	7000	4:00	7000	14,000
8:08	3550	7100	4:08	7100	14,100
8:16	3600	7200	4:16	7200	14,200
8:24	3700	7300	4:24	7300	14,300
8:32	3800	—	4:32	—	14,400
8:40	3900	—			
8:48	4000	—			

The time allotted to each transmission is now 8 minutes, divided as follows:

2 minutes — QST QST QST de W1AXV
3 minutes — Characteristic letter "G" broken by call letters.

1 minute — Statement of frequency in kc. to nearest integral figure and announcement of next frequency.

2 minutes — Time allowed to change to next frequency.

The frequencies announced by W1AXV are accurate to within 0.01%.

The time is E.S.T. 8:00 p.m. at W1AXV is 0100 G.C.T. and 4:00 p.m. is 2100 G.C.T.

European listeners are urged to use and report on Schedule BB which is transmitted particularly for them.

W1AXV QRG SERVICE

More fellows ought to take advantage of the "individual QRG service" being offered by W1AXV. Anyone who can raise W1AXV during the hour preceding each S.F. schedule can have his transmitter frequency checked to within 0.1% by simply asking for a check. Complete details of the service were given in May QST (page 47). Very few have taken advantage of this opportunity on the first transmissions and more users are wanted.

The frequency used by W1AXV during each QRG period will be approximately the middle frequency of the S.F. sked which follows. The exact frequency for each period will be:

Preceding schedule A, 3700 kc.
Preceding schedule B, 7100 kc.
Preceding schedule BB, 7100 kc.
Preceding schedule C, 14,200 kc.

"MARKER STATIONS" TO BE APPOINTED

A selected group of amateur stations which operate on precise frequencies near the limits of the amateur bands are going to be appointed "Marker Stations." To qualify for such appointment, the station must be one equipped with adequate precision frequency apparatus to guarantee that it can maintain its designated frequency to within 0.1%. The types of transmitters best for this service are crystal-controlled outfits with crystals operated at constant temperature and self-controlled sets which are continuously monitored by a constant-temperature crystal standard. The frequency of the station's standard must be ac-

curately known and frequently checked against standard frequency transmissions. Calibration by the Bureau of Standards at Washington would be best of all.

Such marker stations will not be permitted to operate "flat on 7000" or on any band's limiting frequency. The frequency specified must be not closer than 0.1% of the limit.

If you have the equipment and ability to render service to amateur radio as the operator of a Marker Station, write HQ and give us the dope. The number of stations which can be appointed must be limited in number and they must be the best we can find. Their calls and operating frequencies will be published regularly in QST.

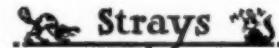
— J. J. L.

New DeForest Tubes

THE DeForest Company has recently brought out a d.c. screen-grid tube which, so far as we know, has no counterpart in the types made by other manufacturers. It is known as the 422-A, and is equivalent to the 422 except that the filament consumption is only 60 milliamperes, as compared with 132 m.a. for the usual '22. The filament voltage is 3.3. The drain on the "A" battery is, therefore, the same as with a Type '99, which makes the tube well suited for portable receivers. The 422 and 422-A differ from other Type '22 tubes in that their plate resistance is 250,000 ohms, with a mu of 150, and mutual conductance of 600 micromhos. With this low plate resistance a greater portion of the theoretical amplification of the tube can be realized in practical circuits.

The new 566, a mercury-vapor rectifier, is similar to the UX-866, although differing in several important respects. The maximum inverse peak voltage rating is 7500, and the peak current is 600 m.a. The construction of the filament is rather novel, because it is in the form of a horizontal "Z" instead of the usual inverted "V". This construction makes the plane of the anode and the plane of the filament parallel.

There is also a 572, with the same sort of envelope as the UX-872, but with internal construction like the 566. The inverse peak voltage rating on this tube is also 7500, with a peak current rating of 2.5 amperes.



The Constitution and By-Laws of the League have been reprinted in revised form showing all amendments up to May 15, 1930. A copy is available to any member of the League upon request.

Naval Reserve Holds Its First National Emergency Drill

By William Justice Lee*

THE Volunteer Naval Communication Reserve held its first national emergency drill by radio on May 1, 1930.

This was an event that had been looked forward to for many months, not only by various Naval Reservists in all parts of this country, but also by the personnel of the Office of Naval Communications, Navy Department, Washington.

At 4 p.m. E.S.T. on May 1st a despatch addressed to the Commandant of each Naval District in the continental United States was handed to the supervisor in Radio Central, Navy Department, Washington. This message was classified as urgent, taking precedence over what is known as priority traffic, and instructed each Commandant to arrange to have either the master or alternate reserve radio control station of his district manned at 10 p.m. E.S.T. This also included the Naval Districts on the Pacific Coast.

Some few days prior to this emergency drill, instructions had been forwarded by the Chief of Naval Operations to the Commandant, Twelfth Naval District, San Francisco, instructing him to designate one of the two Twelfth Naval District Reserve control stations as the senior control station for the West Coast. Accordingly Reserve Control Station NDH, located in San Francisco, was so designated. In the meantime instructions had been forwarded to the Commandant, Ninth Naval District, Great Lakes, Illinois, to arrange so that when the national emergency drill was conducted, Master Control Station NDS, Chicago, could act as relay for any traffic between the east and west coasts. There was no advance notice given to the reserve personnel as to just what date would be decided on for this emergency drill as otherwise the emergency feature would not have amounted to much.

The senior control station for the United States was NKF, the transmitter of which is located at the Naval Research Laboratory, Bellevue, D. C., and which is keyed from Radio Central, Navy Department. This station and all others in the master control reserve net operate on 4045 kc.

The purpose of this drill was to determine speed of mobilization, completeness of representation of districts, control over the reserve stations by each district Commandant and the feasibility of relaying radio messages back and

forth across the United States over the Naval Reserve Net. In the urgent message of instructions sent to Commandants on May 1st one requirement was that certain districts should originate short messages, some of which were to be addressed to the Chief of Naval Operations, Washington, and others addressed to districts on the opposite coast. The plan of the drill was worked out so that each district, both east and west coast, would either send or receive one message.

Promptly at 10 p.m. NKF, with the writer as operator, broadcast a short message of instructions and then proceeded to call each station in numerical order of districts, beginning with the first and ending with the ninth. Every naval district reported with a station manned and ready for traffic. On the west coast according to instructions, the Eleventh and Thirteenth Naval Districts reported to senior control station NDH at San Francisco in the Twelfth Naval District.

By 10:33 p.m. a Naval Reserve radio station in every Naval District in the United States had reported itself manned and ready for traffic. This constituted a 100% mobilization, based upon the orders from the Chief of Naval Operations. Most of the eastern Districts originated messages as instructed and sent to Chief of Naval Operations through NKF. There were one or two stations that failed to originate messages, but in the main compliance with orders was very complete.

The naval districts represented, the call letters of the stations on the air, and the locations were as follows:

District of Columbia — NKF, Bellevue, D. C.
(Senior Control)

First Naval District — NDA, Medford, Mass.
Third Naval District — NDF, South Manchester, Conn.

Fourth Naval District — NDC, Wilmington, Del.

Fifth Naval District — NDE, Baltimore, Md.

Sixth Naval District — NDJ, Atlanta, Ga.

Seventh Naval District — NDL, Orlando, Fla.

Eighth Naval District — NDD, Pensacola, Fla.

Ninth Naval District — NDS, Chicago, Ill.

Eleventh Naval District — NDV, Los Angeles, Calif.

Twelfth Naval District — NDH, San Francisco (Senior Control)

*Lieut. Comdr., U.S.N.R., Navy Department, Washington, D. C.

Thirteenth Naval District — NDQ, Seattle, Wash.

NDH of the Twelfth Naval District relayed for 12th and 13th Naval Districts for purposes of transcontinental communication.

Arrangements had been made with the national headquarters of the American Red Cross, Washington, for a message to be sent by them to the American Red Cross representative in San Francisco. The plan provided for this message to be forwarded via NKF Washington, NDS Chicago, and NDH San Francisco, and to be delivered by NDH. A reply was to be obtained and returned over the same route. The message from Washington was given filing time of 10:10 p.m. This was sent to NDS at 10:52 p.m. and delivered by NDH to addressee in San Francisco at 11:20 p.m. The reply was filed by Red Cross, San Francisco, two minutes later at 11:22 p.m. and delivered to Red Cross, Washington, at 2:22 a.m. May 2nd. The total time elapsed was three hours and thirty minutes. This is comparatively slow, transcontinental relays having been accomplished before in less time, but they were always organized along beforehand and involved considerable preparation.

As far as the National Emergency Drill was concerned, the maximum advance preparation was six hours and many of the stations did not receive their notice to be on the air until just before the time set, as instructions had to be relayed from the Commandants, in some cases several hundred miles by telephone or telegraph. In addition to this there was a very severe electrical storm in the neighborhood of Chicago, heavy atmospherics seriously delaying the reception of traffic from the West Coast. The east-bound Red Cross message sent by NDH to NDS had to be repeated several times and some words in the message had to be repeated fifteen times before reception was finally completed and the message received. The operator on duty at NDS was none other than Lieutenant Commander R. H. G. Mathews, C-V(S), (Matty of 9ZN), and although he reported his antenna had been twice struck by lightning during the drill, no serious harm was done and he stuck to his station until the traffic was cleared. The drill was concluded at 2:07 a.m. E.S.T. May 2nd by the following message:

NDH NDS V NKF BT WELL DONE 0207 VA

There certainly was a thrill for everyone who took part in this drill. It was a wonderful thing to hear each district station answer smartly and in order when it was called.

Let us stop and think what this means. In 1925 when the Volunteer Communication Reserve was first worked out on paper there were no naval reserve stations and very few officers and men — certainly less than 150 in the whole United States. During the course of the next five

years this small organization developed and expanded until it now has one or two reserve control radio stations in every naval district, assigned a naval call ("N" call). Many of these stations are privately owned, although the Navy is now planning to furnish government transmitters to certain districts during the coming year. The progress from nearly nothing in 1925, to the present time, is shown when every continental naval district can man a reserve station during an emergency drill with six hours or less notice. A special frequency for the Naval Reserve represents another great advance, for a few years ago there was no special frequency provided for naval reserve radio communication.

In the matter of personnel, great strides have also been made and the Volunteer Communication Reserve today represents over 2000 officers and men appointed and enlisted from among radio engineers, commercial operators, and the amateurs. We are probably safe in saying that the Communication Reserve today represents over 1000 of the best amateur stations in the United States.

There are many Navy and Naval Reserve activities in which our Communication Reservists take part. Recently the *Eagle 52* has been making week-end cruises from the Philadelphia Navy Yard and the ship's radio is manned by a Volunteer Communication Reserve crew, consisting of one officer and three or four men. The Commanding Officer of the *Eagle 52* has expressed himself as pleased with the services performed by these reservists and in fact it is understood that until these arrangements were made this vessel had not satisfactory communication with its district headquarters. The same system is being followed in the Fifth Naval District at Baltimore and in other naval districts.

There are few amateurs to-day who do not know something about the Communication Reserve. Almost anyone who is equipped to listen on the eighty-meter band (4000 kc.) can hear naval reserve stations operated every night in the week except Saturday and Sunday. The control stations will be found on 4045 kc., between NAA on 4015 kc. and WIR on 4050 kc. One of the most active nights in the week is Thursday, because on that night the national drill net is operated from NKF. At 9:30 p.m. E.S.T. each Thursday NKF sends a short message broadcast by radio telegraph to all districts except the West Coast. When this is concluded a short drill is held, and messages sent and received in tactical procedure.

The writer has been connected with amateur, experimental and naval reserve radio for years and has seen the Naval Communication Reserve grow from almost nothing to its present state of development. It seems now almost safe to predict that within a very few years more this branch of

(Continued on page 84)

Hamming With a Portable in Africa

By Clyde De Vinna*

SENDING a troupe of thirty people into Central Africa to make a motion picture from the popular book "Trader Horn" was in itself somewhat of a problem, and as the problem got more and more nearly toward a solution, many smaller and erstwhile unthought-of details began to crop up. At the outset it had been decided to establish our base at some central point, there to have our offices and laboratory for the processing of the film as we "shot" it. Immediately came the thought, "How to keep in touch with that base?" for we were certain to be moving about the country; more than likely to be completely out of touch with the telegraph system, and yet it was imperative that fast and constant contact be maintained with the laboratory, for our following move depended upon their check on the film sent in from that location. Moreover, we must keep in touch with our business manager who would be "out ahead" of the company making arrangements for forthcoming moves, and also to be reckoned with were arrangements for supplies (must have food!) — medical emergencies to be considered — and many such items.

It came somewhat naturally that a ham should be the solution; indeed, what problems and emergencies of like nature during recent years have not been solved by hams?

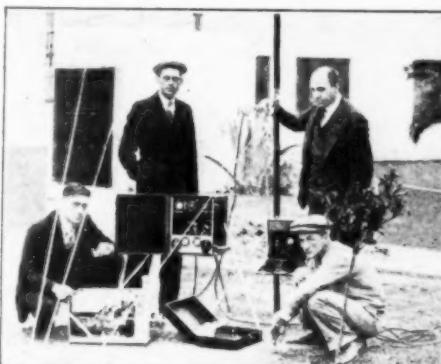
Perusal of the call book and a hurry up message to W1MK brought a list of the most active amateurs in British East Africa. A 'phone call to our old and reliable friend Ralph Heintz in San Francisco brought him down on the next train with one of his compact little portable outfits. Fred Roebuck, late of KUP, came along for moral support, but we gave him plenty of work to do when he arrived.

The demonstration of the set at the studio that afternoon was attended by a large and enthusiastic gathering. Incidentally, the sound department of the studio includes in its personnel a great many hams and ex-hams; as our "audience" increased, the population of the sound department decreased proportionately — so much so that the boss himself came out and asked us if we would please shut down so they could do a little recording in the sound department.

The set is a gem. Completely portable and independent, it can function in any location, and on very short notice. There are six units in the outfit, each with a heavy canvas cover, and the whole lot together weighs just over two hundred

pounds. Power is derived from a gas-engine-driven magneto generator which supplies the primary of the plate transformer at 65 volts, 240 cycles, and filament current at 10 volts. The transmitter is H. & K.'s modification of the standard t.p.t.g., using one "50-watter" and is simple, yet exceedingly flexible and efficient.

The receiver is standard detector and two-step, using tube-base coils and Western Electric "N"



Photographs by Bob Roberts, M.G.M. cameraman with "Trader Horn" African Expedition.

THE COMPLETE OUTFIT SET UP FOR TEST IN HOLLYWOOD

The gasoline engine generator set is on the ground at the left with the spare-parts box opened beside it. The 50-watt transmitter and the receiver are on the tripods, near the base of the telescopic antenna. W. S. Vandijke, director of "Trader Horn," stands behind the transmitter while Ralph Heintz, designer of the outfit, holds down the antenna. Fred Roebuck, ex-KUP and W6XBB, is custodian of the power supply with Clyde De Vinna unsuccessfully attempting to hide behind the small bush.

tubes. Both the transmitter and receiver will operate on any frequency between 3700 and 19,000 kilocycles.

The radiating system consists of a telescopic brass mast (which can be extended to a maximum height of about thirty-five feet) as the antenna, and an adjustable counterpoise.

A 200 candle-power light is furnished which, when connected to the generator, supplies illumination for night setups. Incorporated in the receiver is a drawer which carries the headphones, spare tuning coils, and a wavemeter. Another felt-lined compartment carries the two transmitting tubes (one spare) and five receiving tubes. A compartment in the back holds three No. 6 dry cells comprising the "A" battery and two blocks of small 22½-volt "B" battery. Both the transmitter and receiver are provided with detachable

* W6OJ-W6ZZK, ex-FK6CR, Chief Cinematographer, 8029 Hemet Place, Hollywood, Calif.

legs, and the lid of the receiver forms the operating desk when open. The accessory case is used as a seat. The outfit is truly an independent unit.

So much for description. As to performance, it's the berries. Something in the neighborhood of 700 messages were exchanged between our outfit

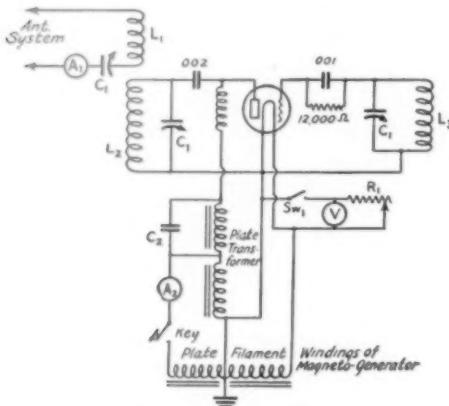


FIG. 1.—THE H. & K. 50-WATT T. G.T. P. TRANSMITTER CIRCUIT

The plate supply is a.c. and is now illegal for amateur use in the U. S. A.

L₁, L₂ and L₃—Copper-tubing antenna, plate and grid coils equipped with plug-in mountings. Any one of the eight coils may be plugged in the antenna, plate or grid circuit. This arrangement gives a frequency range between 19 mc. and 3700 kc. with a set of eight coils having 3, 4, 6, 7, 10, 11, 14, and 15 turns respectively. The diameter of each is approximately 3 inches.

C₁—450- μ fd. transmitting variable condensers.

SW—Protective switch in tube base to disconnect shunt filament rheostat when the tube is removed.

RFC—Plug-in radio-frequency choke.

R₁—Shunt filament rheostat. The characteristics of the magneto type generator make this filament control most satisfactory.

C₂—Condenser to improve power factor of supply.

A₁—0-2 amp. antenna ammeter.

A₂—0-5 amp. a.c. supply ammeter.

V—0-15 volt filament voltmeter.

in the field and the base station in Nairobi, working from 50 to 1500 miles and under nearly every conceivable condition — but I'm getting a little ahead of my yarn.

Our arrival in Nairobi and inquiry as to the license situation was met with the information that it would be difficult if not impossible to obtain the desired authority to use the set, the "powers that be" there not being entirely in sympathy with the amateur, and less than that where our semi-commercial proposition was concerned. Several interviews were had with the postoffice authorities and, fortunately, we were able to interest them in the short-wave phase of radio. A demonstration of the set one afternoon, working with their government station VPQ at Mombasa (a distance of about 500 miles) was very interesting to them and with the aid of the bunch at VPQ, as well as those at Nairobi, arrangements were finally made to operate the set.

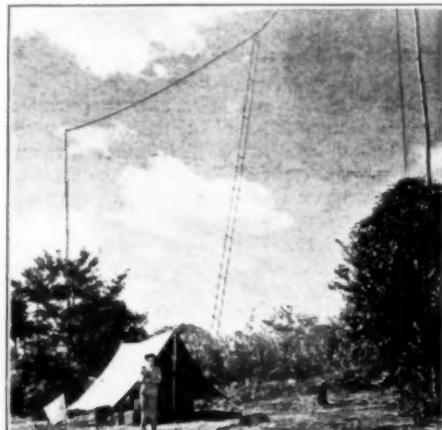
A special license was granted to Mr. Sydney Pegrum, FK5CR, at Nairobi, to handle the traffic at the headquarters end.

A finer lot of chaps than the personnel of VPQ would be mighty hard to locate; the chief, George F. K. Ball (VQ4MSB), Sam Hughes, and L. J. Hughes — all friendly and more than anxious to coöperate.

Immediately upon being authorized to operate our set under the call FK6CR, a test schedule with VPQ was arranged for each evening, and was carried out during the entire trip with very few misses. This was interesting to us, and I believe was of considerable value to the Government; a complete log was kept, and also made a very comprehensive record of transmitting and receiving conditions throughout the colony.

"Peggy" — then FK5CR and now VQ4CRE — was whole-hearted in his coöperation, and went to no end of trouble and extra work in rebuilding, etc., to take care of his end. That the deal was a success is due just as much to his efforts as to those of anyone. It's true that he had never handled traffic before (being a law-abiding Britisher), but a ham's a ham under any flag and there's not much that can stop him! A little kind assistance from "Mac" now and then, and everything went swimmingly.

A preliminary scouting trip served admirably to get the arrangement broken in, and by the time we swung into production some six weeks



SET UP FOR OPERATION IN THE BELGIAN CONGO

This QRA is some 2000 miles from the west coast of Africa. The set is in the tent with the portable Zep antenna swung above it between the two trees. This antenna system gave very good results on both the 7- and 14-mc. bands.

after our arrival in the country, everything was running smoothly, or as nearly so as could be expected.

Most of our moves were made by automobile; a specially designed Hudson carrying the most

vital parts of the camera outfit and the radio set. Thanks to very efficient co-workers, I never had to bother about details of camera organization, and was able to start putting up the set immediately upon reaching a location. Mr. Van Dyke, our director, gave me full leeway in this respect, and many a choice tent site was given up to the radio department because it was the most suitable spot for the set. It's odd how often this coincidence happened — the most pleasant spot in camp proving to be the most efficient location for the wireless set (MIM).

Since most of our work was in the wooded sections of the country, the telescopic mast was given up in favor of the old familiar "Zepp," thereby gaining not only speed of getting into operation but also in overall signal efficiency. The detachable feeders described in a recent issue of *QST* were a great help in getting the set up quickly.¹ The radiator was 65½ feet long, and the feeders about 38 feet. Series tuning was used in the 7-mc. band and parallel tuning for 14 mc., the transmitter being provided with convenient facilities for this change. When conditions were such that 3500-ke. seemed advisable a separate counterpoise was put up, but the great bulk of the work with Nairobi was done in the 7-mc. band.

Operating conditions in Africa are in general pretty bad, at least in those parts of the country where we worked. We were at an average elevation of about 4000 feet, but usually more or less surrounded by mountains as high as 14,000 feet or so, and something in this combination of high, cool altitudes and the warm air currents from the subtropical sections of the country made for some mean weather conditions. Static abounds and almost every day we were visited by thunderstorms and often found it necessary to ground the antenna and let it rain.

Our work developed into a more or less regular routine; the VPQ sked at 6:30 p.m. local time, and FK5CR at 6:45. We usually cleared him before dinner (7:30), although frequently the schedule was resumed after dinner. When there were no other demands, we used to work one or more of the Philippine gang in the early evening, they having just finished with their W6 skeds; had many fine QSO's with them and gave them quite a bit of traffic for the folks back home. Some evenings afforded sufficient spare time for chats with some of the European stations (there are many splendid ones), or with some of the South Africans. Many enjoyable friendships and "unofficial" skeds were thus made.

The outstanding pleasant recollection of the

¹Nov. '29 *QST*, pp. 43.

trip, however, is the way W1MK kept after us — "RP" and some of the rest of that outfit at Hartford pounding away "blind" night after night for months. W1MK was heard on every sked that I was able to listen to, and we tried our durndest to get through to him, but it wasn't in the cards; 7 me. simply couldn't make the grade. We heard hundreds of W's in the 7000 band, in every district except the sixth and seventh, but couldn't raise a single one of them.

Incidentally, one gets a great idea of the situation generally, and of the rotten (apologies to T O M) notes androttener operating practice, by getting off at sufficient distance to hear nearly all of the stations come together in a sort of a focus. To the credit of those who deserve it, and there are many, let it be said that there was a great improvement noticed during our stay down there; during 1929 there seemed to be a sort of general cleaning up and general betterment of signals. Up to the time of departure, however,



THE "TRADER HORN" COMPANY ON THE UPPER NILE IN UGANDA COLONY

The portable set followed everywhere, from dense jungle to rocky gorge, keeping contact with the outside world.

Utopia had not been reached! It was interesting to note some features of the more consistent signals. The best ones heard did not necessarily originate at the high powered stations; in fact, one of the two sixes heard was using a single 210 — our friend W6BWS in Phoenix, Arizona. The other six was W6EII, Oren Baker of Los Angeles, using a 50-watter. Checkups have indicated that signals from a well-adjusted, intelligently operated low-power layout will run circles around the so-called high-powered set operated carelessly. You fellows who sit back here in this land of QRM cannot imagine how I longed for a QSO with some of your good stations — and I nearly burned up that little generator trying to raise some of you,

especially OM Roebuck, who I knew was pulling for me from KUP and W6XBB.

14-mc. signals finally came through, but the trouble with them was that they came in beginning about 11 p.m. local time, and even the most enthusiastic of us can't stay up half the night and then get up before daybreak the following morning. Some mighty fine QSO's were had with 1's and 2's on 14 mc., though. A fairly com-

tary — the natives styled me "the master who talks with the winds" — descriptive, at least.

In Africa, four o'clock tea is an institution, and we quickly fell into the habit. In this connection are served what they term "biscuits" (we know 'em as cookies), and one particular variety became such a favorite with the gang that it became difficult to keep a sufficient supply on hand. The head boy of the commissary department used to keep a few tins of them hidden away for some of his favorites, or at least we so suspected. One afternoon the steamer had just arrived with a consignment of supplies previously ordered by radio, and I knew that in the shipment were several cases of these particular biscuits, so when my personal boy arrived with the tea minus the favorite wafers, the head boy was summoned. He protested at great length that there were none of the favorite biscuits in camp, nor had there been any for a great many days; whereupon I explained, through the interpreter, of course, that I had spoken to the wind gods in connection with this momentous matter, and that they had assured me that upon this very day would arrive several cases of that particular delicacy — in fact, that right at that very moment, down at the landing a mile or so below camp, they were being unloaded. He could scarcely believe his ears. After a visit to the landing proved that the wind gods were correct, never again was there a scare.



SHOOTING SCENES IN THE CROCODILE POOL

The armament wasn't donned for photographic effects — sometimes a "crock" made shooting necessary with weapons as well as cameras.

plete log was kept, and some of these days I hope to QSL each of them. Because of the pressure of work since our return I have had to neglect them somewhat, which wasn't my intention by a whole lot, but they can take this as an open letter of appreciation until I have a chance to write them a better one.

When I had time, I sent in lists of calls heard down there — not complete, by any means, but enough to give an idea of how the signals were coming through.

During the months of our stay many interesting experiences were had — some funny, and some not so humorous. The radio set was a never ending wonder to the natives — they could never understand it, of course, but they associated it with the land telegraph system; in fact, the first few moves we made the gang whose duties were to take care of the tents stood by to help dig up the wires which they were sure we had buried some place! Assistance was never lacking, and the boys would help to whatever extent they could — putting up the lines for the antenna, or putting up my tents in record time — but they would not touch a wire or any part of the set proper. I found out later that Mr. Waller, our safari superintendent, knowing their liking for bright or glittering things, had very seriously cautioned them against meddling with the equipment, telling them that if they touched anything connected with the radio set, huge tongues of flame were sure to leap out and completely consume them. Needless to say, nothing was ever bothered. After their fashion of naming everyone in the party — not always complemen-



SHOOTING A SOUND SEQUENCE IN A NATIVE VILLAGE, BRITISH EAST AFRICA

The condenser microphone is suspended above the author's head and connects to the portable amplifier equipment at the right. The actual recording takes place in the sound truck parked in the background.

ity of the good biscuits, or of anything else in the store!

It wasn't all a joke down there, however, by a great deal; seamier sides put in appearance frequently. Late one night a playful cloudburst filled our camp with a few feet of water; the wind blew, and several tents came down, among them the one housing the transmitter. Imagine a high-frequency transmitter soaking wet! Once we had the "Zepp" tied off to an old dead tree; the wind brought the tree down alongside my tent. And so on. Each new location had its thrill of a new and

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We finally evolved a scheme which saved us a good deal of effort as well as adding to the efficiency of the set. When we were in one of our semi-permanent camps where we would be likely to remain for a week or more, we put up the whole camp equipment, which included a Kohler lighting plant, Frigidaire, projecting machine, etc. — in other words we lolled in the lap of luxury, at least temporarily. We obtained a half-kilowatt 500-cycle generator, vintage of about 1910, which we hooked to the Kohler, controlling it by means of a remote control magnetic switch (dope from *QST*) to cut off the a.c. at the machine, eliminating the hash. The scheme worked splendidly, putting an R5 to R6 signal into the East Coast U. S. A. stations, and giving FK5CR plenty of signal strength to help battle the static. A great deal of our traveling was done with a rather limited camp equipment.¹ However, when we planned to be in a locality but a short time, only the necessities were taken, and those occasions brought on the use of the gas engine generator. Nearly as good results were had, however, and some of the stations expressed a preference for the 240-cycle note.

There were times when the set had to be carried by porters, sometimes to quite a distance, and at such times the equipment was quite likely to receive various and sundry bumps and jolts; but it showed no ill effects from such treatment. Once the generator fell into the Nile River, but seemed none the worse for it. Getting thoroughly soaked by the numerous rainstorms was more or less a regular occurrence, and while the cases show considerable wear and tear, the "works" never missed a shot.

One move we made, across Lake Albert and down the Nile, called for a stay of three days on the S.S. *Lugard*, one of the river type of steamers which serve that territory. It was with a great deal of doubt that we put up the set, because the best installation we could get resulted in the aerial dangling out toward the stern not more than ten feet above the galvanized iron roof that covered the whole ship; visions of absorption, wobulation and what-not came to mind, and you can imagine my embarrassment when VPQ reported the loudest sigs of the whole trip — FK5CR said he thought we had arrived in Nairobi, and the W's gave me R7! We had a lot of fun out of it, and Captain Cullum, the genial skipper, got a great kick out of sending TRs to his headquarters — the first ship equipped with wireless on Lake Albert! Another great scout,

Captain Cullum; true, the ice supply was a little shy, but everything else was FB!

Practical results had from the set were legion. Aside from our routine work, there were a great many instances where it saved us many times its cost and bother of maintenance. Once, for instance, we divided our outfit, taking a skeleton



IMAGINE A HIGH-FREQUENCY
TRANSMITTER SOAKING WET

The author is cleaning the outfit up after a cloudburst. No harm done, however, because the set is designed to work in the rain — the specifications call for operation of the set after a hose has been turned on it!

crew into the Belgian Congo for three or four weeks work and sending the remainder of the party to Kampala, agreeing to a rendezvous some weeks later. After a few days of the bad weather then prevalent in the Congo, however, Mr. Van Dyke decided to recall the rest of the company and resume work along the original lines. With the use of native runners and the land telegraph, this probably could have been accomplished in ten days or two weeks; thanks to the radio we were all back together and ready to resume work in four days. Figure this out at the rate of \$5,000 per day, which is the estimated cost of our operations throughout the entire trip.

Dr. Clarke, our jolly and well-liked safari surgeon, found that some of his pet serums had been lost during one of the moves; a message to Nairobi started a fresh supply to us that night. Measurements for a broken piece of camera equipment were sent in by radio, and a new part left Nairobi the next morning. Details for the construction of a specially built camera car to be used in photographing animals were sent in, and the car was waiting for us when we arrived in Nairobi a week later.

One of the troupe was so worried about the condition of relatives ill in Nairobi that he announced that he was leaving for there the following morning; this would have stopped production absolutely, as there was nothing we could do without him, he being in every scene, and the trip to Nairobi and return would have taken from a week to ten days. But "Peggy" cranked up his trusty Rugby (he is an automobile electrician by trade) and following a conference with

the hospital officials as well as with the party in question, sent me a lengthy and detailed report of the situation, and we resumed production as usual the next morning.

Reception was uniformly difficult; QRN with us almost constantly as well as other forms of diversion. One night I was QSO W2FP, at about five p.m. his time, and he complained that the QRM from the passing automobiles (14 mc.) made it very difficult to work. I replied that QRM from the hyenas yipping around my tent made it difficult to read his R5 sigs at times, so we were even. It was true, too; we were down in the game country, and the hyenas were thick around the camp after the bait we were putting out for other animals.

For the most part, the conventional single wire receiving antenna was used, length proportional to the QRN at the time, some experiments were made with the tuned doublet as described in *QST*, but there wasn't sufficient time to give it a thorough trial.

Radio work in Africa is very seasonal. There are months when it is impossible to work any DX at all, and other times when signals come in well from nearly all over the globe. One night I clicked with a fellow in Cairo, Egypt, who told me that he had been listening for months, and mine was the first signal he had heard. Verily, the one main requisite of hamming in Africa is patience, and plenty of it.

They're a fine bunch of hams down there, aggressive and keen on their organization; they publish a snappy journal called "QTC" which they kindly mailed to me each month while we were there.

En route both ways a good deal of fun was had with the set. One time, from about the center of the Red Sea, we worked a station in Venezuela, as well as some not so far away. The trip was very interesting from a fraternizing standpoint. Obviously I cannot call the ships by name, but we were on British, German and Italian ships, and I found the operators uniformly courteous and friendly, and all very much interested in the little set, as well as the project in general. I even maintained sked with one of the ships for months, whenever he came within range. "Sat in" on the various ships, and had plenty of fun doing it. Incidentally, one ship had a difficult press sked

to be kept, and the operators were amazed at the way the little Heintz and Kaufman receiver outperformed their rather elaborate screened-grid affair, which it did time after time.

FK6CR is history now, but there remain a lot of mighty pleasant memories from the trip. The W6 gang was mighty loyal and fine in the way they kept looking for us and trying to raise us, as were the hams pretty well all over the U. S., and I feel under great obligations to all of them. The set is being overhauled now, getting ready for another trip which may come up within the next few months, and perhaps then I may QSO some of the stations I missed on the African trip.

For the benefit of those who may be interested, the picture made in Africa on this trip is "Trader Horn," and will probably be released during 1930 by Metro-Goldwyn-Mayer. While

you are enjoying it you can figure that "ham radio" meant a lot to us down there, both from the standpoint of time saved and of having our hobby right along with us to pass away the spare time which otherwise would have been tedious in the extreme.

Strays

W9NJ found this one in a newspaper story of recent Marconi radiophone experiments:

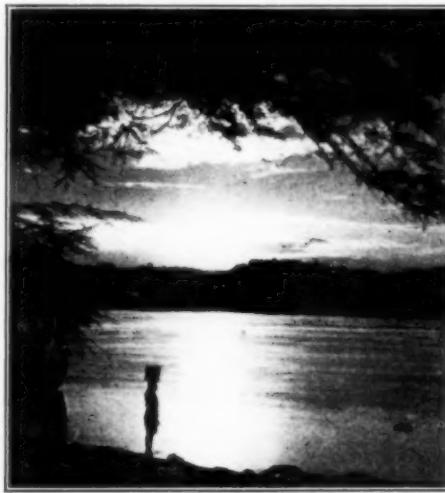
"Senatore Marconi reported that his power, taken from a storage battery, was only about three-quarters of a kilowatt and that he was broadcasting on a frequency of 11,254 horsepower kilocycles."

Maybe he uses a prony brake as a frequency meter!

If it weren't for the newspapers we'd be short of "strays." A paper in Houghton, Mich., referring to the *Handbook* called it the *QST Hankbook!*

Correction

In Fig. 1 on page 10, May *QST*, the plate and grid of the UX-842 modulator tube were reversed in the drawing. The plate should be connected to the choke T_1 and the grid to the secondary of the microphone transformer.



TIME FOR EVENING SKEDS

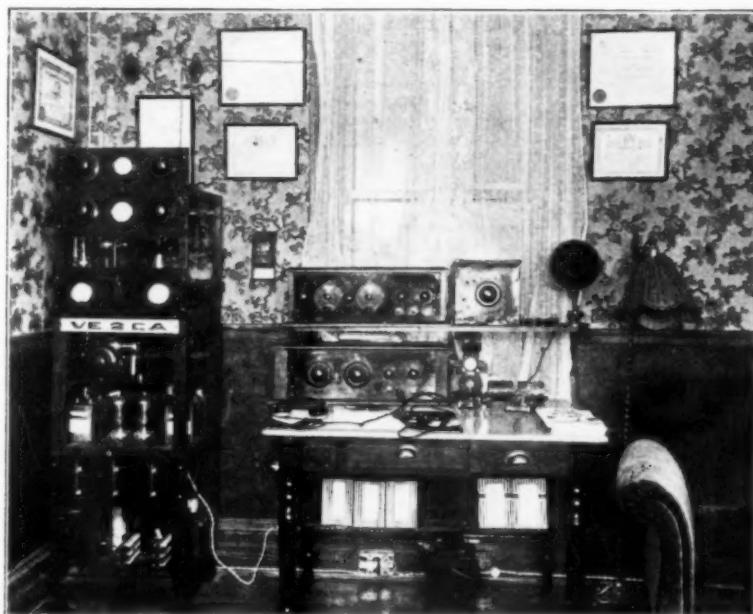
Sunset across the Upper Nile at the camp near Murchison Falls, Uganda, B. E. A.

VE2CA

A Medium-Power Station of Modern Design

Often happens that people who have something to talk about are most inclined to say nothing. If Jim Lamb hadn't dropped in on VE2CA during his vacation last summer, we probably wouldn't have had an opportunity to present this station description in *QST* — and we feel sure the amateur fraternity will be in-

a Hartley circuit. While no exceptional work was done, many fine chats were had with the gang on this continent. In April, 1928, the 203-A died of old age and an 852 was installed, with greatly improved results. In the fall of 1928, spurred on by the League's Technical Development Program, the high-C Hartley was tried, and after



STATION LAYOUT AT VE2CA

As the set is located in the living room, "haywire" apparatus is out of the question.

tered in it, because everything is home-made with the exception of those parts which are more economically bought than manufactured in the ordinary home workshop. Furthermore, it's a good job, as those who have heard or worked VE2CA will testify.

The owners are Mr. and Mrs. Earle H. Turner, of St. Lambert, P. Q. They both operate; in fact, the OW has been handling most of the QSO's during the past few months. Those of us who are married know what such coöperation means; and the others don't need a whole lot of imagination to appreciate it. Earle didn't say just how the Mrs. came to take up amateur radio — maybe it was in self-defense.

The station first went on the air in December, 1927, with a UV-203-A tube of ancient vintage in

considerable experimenting, during which much copper tubing was wound and junked, the present 7000-ke. transmitter emerged. In the meantime the owners became much enthused over the possibilities of the 14,000-ke. band, and a second transmitter for this band only was installed early this year.

A general view of the station is shown in the first photograph. The apparatus is located in the living room and space is limited; consequently the equipment is compact and designed to present a neat appearance. The large frame at the left holds the two transmitters and the power supply; the receivers, monitor, frequency meter and keys being on the operating table at the right and on the shelf above it. Most of the work is done on the 7000-ke. and 14,000-ke. bands, and the

sets can be quickly shifted from one band to another.

THE TRANSMITTERS

Two identical transmitters are mounted on the frame, one permanently on 14,000 kc., the other

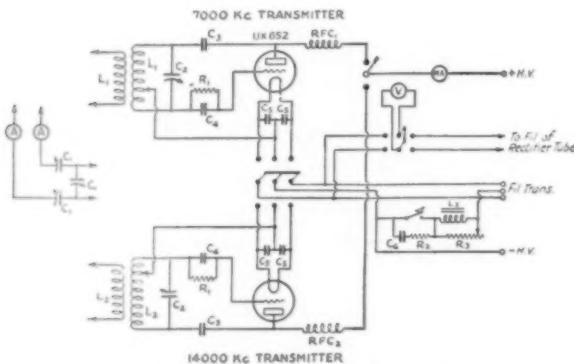


FIG. 1.—THE TWO TRANSMITTERS AT VE-CA

C₁—250-μfd. antenna tuning condenser.
C₂—250-μfd. tank condenser, double-spaced.
C₃—3000-μfd. 5000-volt condensers.
C₄—250-μfd. 5000-volt condenser
C₅—5000-μfd. receiving type.
C₆—4-μfd. telephone condenser.
L₁—7 turns of 5/16" copper tubing, 4" diameter.
L₂—3 turns of 5/16" copper tubing, 4" diameter.

L₃—Special choke—see text.
R₁—20,000-ohm grid leak.
R₂—500 ohms.
R₃—500-ohm variable resistor.
RFC₁—160 turns of No. 30 d.s.c. on 1" form.
RFC₂—160 turns of No. 30 d.s.c. on 3/8" form.
A—Antenna ammeter, 0-3 amp.
MA—Plate milliammeter.
V—Filament voltmeter.

with interchangeable coils for the other two most popular bands, although used mainly for 7000-kc. work. The frame itself is built in two sections; the lower, of heavy construction, containing the power supply equipment and the 14,000-kc. transmitter, extending up to the sign with the station call letters; the top section, of lighter construction, holding the meter panel, 7000-kc. transmitter, and antenna tuning apparatus. The top section may be dismounted by simply removing three wood screws which hold it in place, this arrangement making it easy to get at any portion of the transmitter without the aid of a step ladder. Binding post strips are mounted on the rear of both sections, connections between the two being made by jumper wires. The entire framework is 18 inches square and approximately 6 feet high. It is solidly built and all apparatus is rigidly mounted, with the result that no trouble has been experienced from vibration.

The top panel contains the two series tuning condensers in the feeder system and one of the antenna ammeters. The panel immediately below it contains the other antenna ammeter, the tank condenser of the 7000-kc. transmitter, and the antenna parallel-tuning condenser. Part of the 7000-kc. transmitter can be seen through the opening between this panel and the one below it.

The filament voltmeter, with a double-pole double-throw switch for connecting it across either the filaments of the rectifier tubes or the oscillators, and the plate milliammeter are mounted on the latter panel.

Since both transmitters are the same electrically and very nearly so mechanically, there is no need to consider them separately. The 14,000-kc. transmitter is just below the sign with the station call letters, with the parts mounted in breadboard fashion. Two switches (not visible in the photo) provide the means of transferring the plate and filament supply from one set to the other. One, a triple-pole double-throw switch, serves as a change-over for the filament leads and negative high voltage. A single-pole double-throw switch takes care of the positive high voltage.

A UX-852 is used in each transmitter. The photograph of the rear of the top section of the frame shows the arrangement of the parts of the 7000-kc. transmitter, that of the 14,000-kc. set being similar. The tank inductance is made of 5/16-inch copper tubing wound to an outside diameter of 4 inches, and is bolted directly on the tuning condenser. This coil and the antenna coupling coil are mounted on glass rods, and the coupling is varied by sliding the antenna coil along the rods. The grid and plate

blocking condensers are mounted on the leads between the tank inductance and the tuning con-

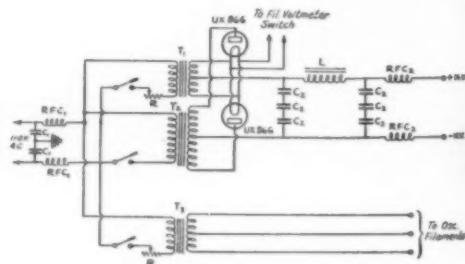


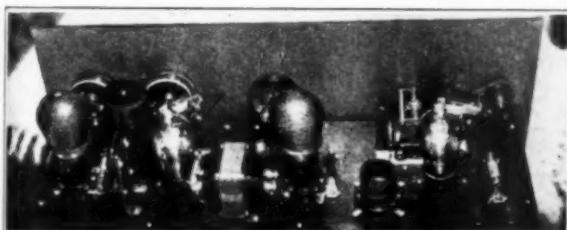
FIG. 2.—POWER SUPPLY EQUIPMENT

C₁—2μfd.
C₂—4μfd. 1000-volt filter condenser.
R—Resistors to control filament voltages—see text.
RFC₁—85 turns of No. 12 d.c.c. on 2 1/2" tube.
RFC₂—200 turns of No. 30 d.c.c. on 1" tube.
L—Filter choke.
T₁—Filament transformer for UX-852's.
T₂—Plate transformer.
T₃—Filament transformer for oscillators.
The construction of the filter choke and the transformers is described in the text.

denser, a portion of each of the leads being flattened out and drilled to take bolts to which the blocking condensers are fastened. The flexible

leads furnished with the tube serve as connections between these condensers and the tube itself. The grid leak is mounted vertically and so placed that the leads are very short. The same is true of the r.f. choke in the plate circuit — the lead between this choke and the plate terminal of the tube is only one inch long.

The tank condensers in both transmitters are rebuilt receiving condensers. That in the 7000-kc. set is a Cardwell, the one in the 14,000-kc. set is an Admiral. Both were originally 43-plate condensers, and alternate plates in both stator and rotor were removed to make a double-spaced 23-plate condenser with a maximum capacity of approximately 250 μ fd.¹ The plate-spacing and insulation of these condensers is sufficient to withstand the r.f. voltages encountered in a transmitter using the high plate voltage taken by the 852. The capacity is somewhat less than that usually considered "high-C" in most amateur transmitters, but it should be pointed out that the characteristics of the 852 are such that a lower C/L ratio will give the same results — so far as frequency stability and freedom from "wobulation" are concerned — as a much higher ratio with other types of tubes, such as the 210 and 203-A. However, high-C is only a means to an end — the proof of the pudding is in the results — and VE2CA's signals are invariably reported pure d.c. and often crystal-controlled. Part of it is undoubtedly in the care used in tuning the sets; the antenna coupling in particular is always very loose, 8 inches or more usually separating the coils.



BEHIND THE PANEL OF THE 4-TUBE RECEIVER

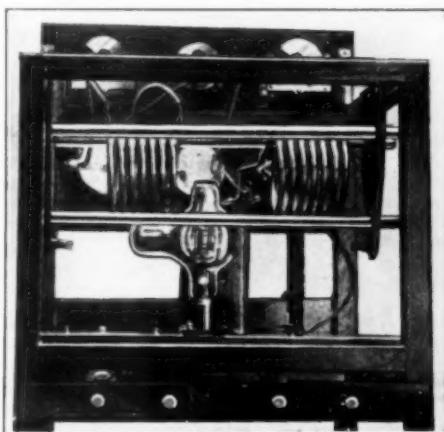
Since the rear view of the 7000-kc. transmitter was taken, a Marconi T250 tube (rated at 250 watts) has been mounted alongside the 852 and can be put in the circuit in place of the latter if desired. The power output with this tube is high, but the note is not so good as with the 852, with the result that the latter is used most of the time.

POWER SUPPLY EQUIPMENT

The power supply comprises the customary transformer, rectifier and filter, with UX-866 mercury-vapor rectifiers. The oscillator and recti-

fier filaments are supplied by separate transformers built for the purpose, the output voltages of which are regulated by separate rheostats in each primary.

The rectifier and filter occupy the compartment immediately below the 14,000-kc. transmitter. The transformers, resistors, and r.f.



A REAR VIEW OF THE 7000-KC. TRANSMITTER
The mechanical arrangement of the 14,000 kc. set is similar.

chokes associated with the power equipment are in the lowest compartment. The three single-pole single-throw switches on the panel at the top of this compartment break the 110-volt line to each of the transformers. The lower section of the frame is constructed of heavy material, as it has quite a bit of weight to carry.

While the arrangement differs very little from standard practice for such equipment, it is of interest because the filter choke and the three transformers are entirely home-constructed. These units are therefore worthy of some description.

The plate transformer is wound on a core of square cross-section with a window 3 1/4 inches square. Each leg of the core is 1 3/4 x 1 3/4 inches. A winding form to fit over one of the legs was made of 1/16-inch fiber, with circular end pieces of the same material. These end pieces are 6 inches in diameter, and are glued to the ends of the square form. Three layers of Empire cloth were wound over the form to provide good insulation; 6800 turns of No. 28 d.c.c. were then wound on the form, taps being brought out so that voltages of 750, 1050, 1350 and 1700 may be obtained each side of the center-tap. The finished winding was taped by passing through the center hole and over the top until the coil was completely covered, after which it was placed on the core leg and firmly fastened in place by means of small wooden wedges.

¹ Recent measurements made in the QST lab on two Cardwell condensers similarly rebuilt indicate that the maximum capacity is 205 μ fd.

The primary winding is on the opposite leg, a layer of tape first being wound around the core, and small fiber end pieces installed to hold the coil in place. This coil has 220 turns of No. 12 d.c.c. Another layer of tape is wound on top of the finished winding. Angle iron braces hold the core

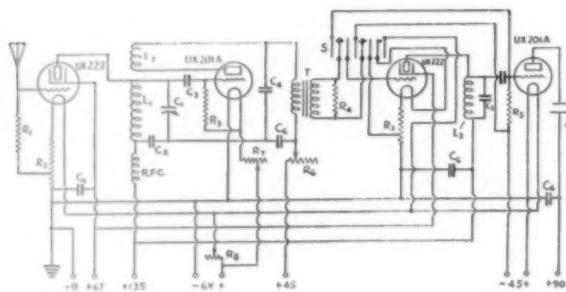


FIG. 3.—IN THIS RECEIVER EITHER PEAKED OR STRAIGHT AUDIO AMPLIFICATION MAY BE USED

C₁—Sliding-rotor tuning condenser.
 C₂—5000 μ fd.
 C₃—100 μ fd.
 C₄—2000 μ fd.
 C₅—6000 μ fd.
 C₆—1- μ fd. by-pass.
 L₁-L₂—Plug in coils wound on tube bases. Wound by "cut-and-try" method to cover amateur bands.
 L₃—Ford coil secondary.
 R₁—10,000 ohms.

R₂—15-ohm resistor tapped at 10 ohms.
 R₃—10-megohm grid leak.
 R₄—25 megohm.
 R₅—8-megohm grid leak.
 R₆—50,000-ohm variable resistor.
 R₇—30-ohm filament rheostat.
 R₈—10-ohm filament rheostat.
 RFC—100 turns of No. 26 d.s.c. on 1" form.
 T—10-1 audio transformer.
 S—Yazley 8-spring jack switch.
 J—Open-circuit jack.

tight, and a bakelite strip (on which binding posts are placed to serve as terminals) is mounted on the braces.

The filament transformers are similarly constructed. That for the 866's is wound on a $1\frac{1}{4}$ x $1\frac{1}{4}$ inch core with a 2" x 3" window. The primary has 440 turns of No. 20 d.c.c., the secondary 16 turns of No. 12 d.c.c., the latter winding being center-tapped. This transformer gives 4 volts, which allows the operator to compensate for fluctuations in line voltage, which are frequent at VE2CA's location. The filament transformer for the 852's is wound on a shell-type core, the cross section of which is 1 x 3 inches, with 2" x 3" windows. The windings are placed on the center leg, the primary having 550 turns of No. 16 d.c.c. and the secondary 65 turns of No. 12 d.c.c., center-tapped.

The core of the filter choke is rectangular, 1 square inch in cross section with a 2 $\frac{1}{2}$ x 6-inch window. One leg is removable, and the coil was wound on it after the usual layers of Empire cloth and tape had been put on. The end pieces are bakelite. The coil consists of 13,000 turns of No. 26 enameled wire, with a layer of paper between each layer of the winding. This leg of the core is not butted directly against the other section, but is held about $\frac{1}{8}$ inch from it by bakelite spacers, in order to provide an air gap. The braces to hold the parts of the core in place

in this case are made of brass, as magnetic material would defeat the purpose of the air gap.

The choke and transformers were thoroughly coated with black Duco after finishing in order to present a neat and business-like appearance.

The rheostats in the primary of each filament transformer (marked "R" in Fig. 2) are wire-wound resistor units taken from an old commercial spark transmitter. Three of the units, which are wound on hard rubber strips, are used in series with each transformer, mounted one above the other, the top one having a slider and bar taken from an old two-slide tuner mounted on it for fine adjustment. Coarse adjustment is obtained by means of a clip on the bottom resistor.

Three 4- μ fd., 1000-volt condensers in series are placed on each side of the choke to complete the filter. The total effective capacity is therefore $2\frac{2}{3}$ μ fd., which has been found adequate for giving a pure d.c. signal in conjunction with careful adjustment of the transmitter.

To prevent any r.f. which may feed back into the power equipment from getting into the 110-volt line, a radio-frequency choke is placed in each 110-volt lead. A pair of 2- μ fd. condensers connected in series across the line, with the common connection grounded, are used as further protection from feedback. This arrangement is of value in reducing interference with broadcast receivers operating on the same line. R.F. chokes are also provided in each high voltage lead, in addition to those in the transmitter itself.

ANTENNA SYSTEM

VE2CA uses the popular Zeppelin antenna, designed for fundamental operation in the 7000-ke. band, harmonic operation being used for the higher frequencies. The antenna proper is 67 feet, 9 inches long, with 39-foot feeders. The feeder spreaders are hard-rubber rods 10 inches long, drilled near the ends to fit the wire, with a longitudinal hole at each end tapped to take a 6-32 machine screw. When the screws are tightened the spreader cannot slip along the wire. These rods make very good spreaders, as they are mechanically strong, are good insulators and their weight is negligible.

The antenna and feeders are both constructed of No. 12 enameled wire. The ends of the feeders are brought into the station through Electro-lead-in insulators inserted in a board which is placed in the window frame at the top. Connections between the lead-in bushings and the transmitter itself are made of copper tubing, as can be seen from the photograph of the station. Either series or parallel tuning of the feeders can be used.

The antenna system produces entirely satisfactory results on both 7000- and 14,000-kc.

A separate antenna, 60 feet long and 40 feet high, is used for reception.

KEYING

Center-tap keying is used, and a filter is provided to eliminate clicks. The filter is the usual lag circuit, and the connections are as shown in Fig. 1. The choke is wound on an old audio-transformer core, following the same construction as outlined above for the filter choke, except that the air gap is only $1/16$ inch. The coil was scramble-wound and as much wire was used as the space in the core window would allow. The wire is No. 28 d.c.e.

This filter is quite effective in eliminating BCL interference.

RECEIVING EQUIPMENT

Two receivers are installed at VE2CA; one, a four-tube receiver patterned after the set originally described in *QST* for November, 1928; the other, a conventional Hartley with a two-stage audio amplifier.

The four-tube receiver is the one on the shelf above the operating table in the station photograph. The "innards" of the set are shown in another photo. The panel is of bakelite, 7 x 18 inches, and is backed with a $1/16$ -inch brass sheet of the same size. The inside of the cabinet is completely lined with copper foil. The apparatus is mounted on a subpanel, with all wiring underneath, which makes the inside of the set present a neat appearance.

The plug-in condensers for various bands used in the original model of this set were not looked upon with much favor, so a "sliding-rotor" condenser was substituted. This was made by rebuilding an old Silver-Marshall 140- μ fd. condenser. With proper adjustment of the sliding plate, the various bands can be spread very nicely. A 7-plate midget condenser can be clipped across this condenser for tuning outside the amateur bands.

Either peaked or straight audio amplification may be used at will, change-over being effected by throwing the jack switch shown in Fig. 3. The switch is a Yaxley product, and has eight springs. When thrown to the position for straight audio amplification, the filament circuit of the UX-222 in the peaked stage is opened, thus saving filament current and also lengthening the life of the tube. The Ford coil secondary in the peaked stage is placed inside a bakelite tube of the proper diameter, with a bakelite disc at the top. It is between the two tubes on the left-hand side of the sub-panel in the photograph of the receiver.

Coils for this receiver are wound on old tube bases. As is always the case, the correct number of turns on each coil was arrived at by experiment, and no details are given here.

The wiring diagram of the Hartley receiver is shown in Fig. 4. It is provided with jacks in the audio stages to permit using either one or two steps of amplification, the last jack also having filament control for the last tube. Regeneration control is capacitive.

The tuning condenser is a rebuilt Cardwell 11-

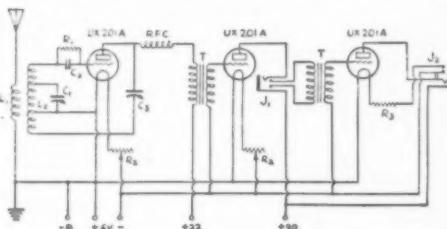


FIG. 4.—THE HARTLEY RECEIVER

C₁—Tuning condenser described in text.

C₂—150 μ fd.

C₃—250- μ fd. condenser for regeneration control.

L₁—5 turns of No. 22 d.c.e., 3" in diameter.

L₂—7000 kc., 16 turns of No. 22 d.c.e., 3" in diameter, with condenser across 8 turns.

14,000 kc., 7 turns, with condenser across 3 turns.

R₁—10-megohm grid leak.

R₂—20-ohm filament rheostat.

R₃—No. 1-A Amperite.

T—3-1 audio transformer.

J₁—Double-circuit jack.

J₂—Open-circuit jack with filament control.

plate tandem affair, in which there are two separate sets of stationary plates. One section is double-spaced and cut down to three plates, and is used for tuning on the 7000- and 14,000-kc. bands. The other section has three plates with normal spacing, and gives good spread on the 3500-kc. band. Both sections may be connected in parallel to cover frequencies outside the bands allotted to amateurs.

The coils are home-made "low-loss" type, space-wound. They are wound with No. 18 d.c.e. wire on a piece of thin celluloid which is wrapped around a 3-inch wooden form. The turns are spaced by winding No. 22 d.c.e. wire between them. After the coil is completed, it is dipped in acetone and allowed to dry, after which the wooden form is removed. This method of construction results in a mechanically strong coil with good electrical characteristics. The finished coil is clamped between two thin bakelite strips and mounted on an old tube base, connections going to the pins in the base. The same primary coil is used for all bands, and is clamped on a slotted bakelite strip which is mounted on a hard-rubber pillar. Coupling is varied both by sliding the slotted strip on which the coil is mounted toward and away from the grid coil, and also by changing the angle between them.

This receiver is not as selective as the four-tube receiver, but is useful when static is strong and QRM not bad, because the antenna coupling can be reduced, and the signal-static ratio thus improved.

As is the case with all really up-to-date amateur stations, a monitor is always used for checking the character of the signal and the position of the transmitter in the band being used. This one is built in a large tin biscuit box (on the shelf above the operating table in the photo), and uses a type 01-A tube in a simple tickler circuit. Three dry cells light the filament, and plate supply is provided by a large 22½-volt B battery. A wavemeter (built before we started to think in kilocycles) is part of the left-over 1928 equipment, and is used for rough checking and as an aid in preliminary winding of coils for both transmitter and receiver.

OPERATION

As can readily be imagined, shifting from 7000 to 14,000-kc. or vice-versa is a matter of only a few seconds. Either transmitter may be used by simply throwing two switches and placing the antenna clips on the proper coupling inductance. Only the antenna tuning controls need be touched, and these can be readily set at predetermined points. The system proved its value during the recent International DX contest, when on different occasions a foreign station was heard calling CQ on the other band and the change-over was made in time to effect a QSO.

VE2CA has worked 36 different countries, including WFA, Byrd's Antarctic base, and is the owner of a WAC certificate. An accurate log is kept of all stations worked, and any changes in the transmitter are noted on it. Experiments which prove to be worthwhile can thus be incorporated permanently in the sets. The operators' chief pleasures are DX and rag-chewing, although traffic is never turned down.

New England Division Convention

THE best of spring weather ushered in the 1930 New England Division Convention on April 25th at the Hotel Bancroft, Worcester, Massachusetts. The morning was spent in hamfesting and in getting acquainted, and the young ladies at the registration booth were kept busy signing up the delegates.

Mr. C. J. Green, W1ASU, Chairman of the Convention Committee, formally opened the convention at shortly after 2 p.m. The first speaker was Mr. E. L. Battey, Asst. to the Communications Manager, A.R.R.L., who led the convention in a traffic meeting. Off-frequency operation and the new regulations were the big matters under discussion. The roll call of SCMs and RMs was answered by SCMs Weeks, Tessmer and Kraus, who spoke on conditions in their respective sections. Following the traffic meeting, Chairman Green introduced Mr. K. B. Warner, Secretary, A.R.R.L. who gave a very interesting

talk on amateur legislation. The delegates received much information from this talk to clarify their ideas regarding amateur radio at "national and international radio conferences."

The afternoon technical talks were excellent. Mr. R. S. Briggs, W1BVL, explained the principle of the pentode and its application to amateur use. Mr. O. P. Susmeyan described the use of the dynatron characteristic in a heterodyne frequency meter, emphasizing the stability of a dynatron oscillator. Both Mr. Briggs and Mr. Susmeyan were from the Champion Radio Works, Inc., Danvers, Mass. Prof. H. H. Newell of Worcester Tech. gave a talk on tubes as high frequency amplifiers, and clearly explained his various points by the use of an oscilloscope.

The evening session was devoted to entertainment and contests under the direction of Mr. U. E. Duval and Mr. L. R. Peloquin, W1JV. The usual run of contests with a few new ones worked in were ably conducted by W1JV. Two vocal artists brought the gang several selections. The Worcester Radio Association presented an amusing farce on A.R.R.L. Headquarters entitled "Wanted, an Assistant Editor." The Eastern Massachusetts Amateur Radio Association's jazz orchestra livened up the evening under the direction of "Red" Cooley, W1AAO. By 11:30 every one was ready to "close shop" and the convention was called off until the following day, Saturday, the 26th.

Saturday morning found the gang visiting broadcast stations WORC and WTAG and the Engineering Building of the Worcester Polytechnical Institute. The boys at Tech gave the delegates quite a treat by showing what 300,000 volts can do! At about 10 a.m. the Army-Amateur and Naval Reserve meetings were held at the Bancroft. Captain Lowman and Lt.-Comdr. Frederick J. Bailey, U. S. N. R., gave those interested some valuable dope on the Naval Reserve and ten new men were signed up. When the various groups had returned from their visits and had assembled again, Chairman Green turned the floor over to Mr. Pratt of the R. C. A. Institutes, Inc., who gave a fine talk and answered many questions regarding the Radio Industry, Talking Pictures, etc. Mr. J. D. Crawford, General Radio Company, brought the convention a most interesting talk on Frequency Standardization, explaining the method of checking the frequency of a crystal-controlled oscillator against Mean Solar Time.

The usual luncheon recess was cheerfully welcomed and the delegates returned full of pep for the long afternoon session. Mr. F. H. Schnell, Chief of Staff of the Radio & Television Institute, Chicago, in typical "Schnell" style, described his newly developed superhet. Mr. F. A. Cowan, A. T. & T. Co., made some of the fellows realize what they are doing when they QRM GBW and

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Experimenters' Section

IMPEDANCE MEASUREMENT WITH THE PLIODYNATRON

By Paul D. Zottu*

IN the February issue of *QST*, Mr. Newbold spoke of the dynatron and listed some practical applications. In the same article he also mentioned the pliodynatron. It is concerning this device that I wish to add to his list another application — an application which I believe will be found very useful and at the same time replace instruments costing many times the price of the device. The pliodynatron can be used to measure the r.f. impedance of a tuned circuit. For this type of work it is probably

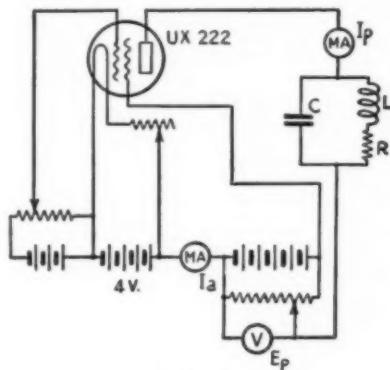


FIG. 1-A

by far the best instrument at the disposal of the amateur. I have used the device for nearly a year and have found it a most indispensable instrument.

It is well known that a circuit made up of L , C , and R , with the elements disposed as shown in Fig. 1-A, will oscillate when it is connected in parallel with a negative resistance equal to the effective impedance Z of the tuned circuit. The impedance of the tuned circuit at resonance is equal to $\frac{L}{RC}$. It has been shown¹ that the pliodynatron can furnish such a negative resistance. The negative resistance of a pliodynatron can be varied in a number of different ways, such as by varying the screen grid voltage, control grid voltage or filament emission. Observations have shown that it varies approximately as the inverse of the cathode current, or expressing the same thing mathematically,

$$r = \frac{K}{I_a} \quad (1)$$

where K is a constant depending upon the characteristics of the tube and the particular conditions under which it is operated, and r is the negative resistance of the device.

In order to determine K it is necessary to obtain a few curves showing the relation between I_p and E_p for different values of I_a . In taking these curves the control-grid and screen-grid voltages should be kept constant. The control grid bias should be of such a value that approximately the desired value of anode current is obtained when the filament is at three volts. The data from which the curves of Fig. 1-B were drawn was taken with no bias on the control grid, which resulted in a wide variation of K for Curve III. The screen grid voltage for a Type '22 tube may be as high as 75 volts positive. For a given value of I_a vary E_p and note I_p . If accuracy is desired, E_p should be varied in small

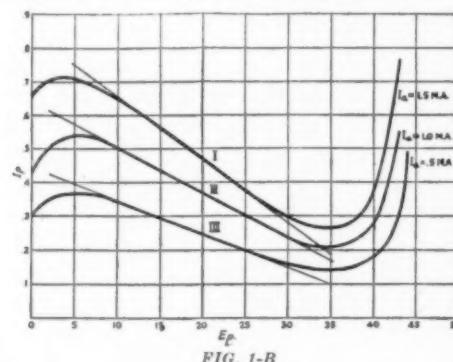


FIG. 1-B

steps, such as two or three volts at a time. A sufficiently sensitive plate-current meter should be used in order to give readable plate current changes. The circuit used for this purpose is given by Fig. 1-A, with the exception that the tuned circuit is shorter. When this data is plotted, curves similar to those of Fig. 1-B will be obtained. With some tubes slight undulations may appear in the curves.

Choose on these curves a value of E_p about which the curves appear to be straight. Determine the slopes of the different curves for this particular value of E_p , substitute the value of the slope² and I_a in Eq. (1), and calculate K . K is calculated for all of the curves, and the mean value is taken as the value to be placed in the equation. The curves of Fig. 2 give values of $K_1 = 81.1$, $K_2 = 74.8$, $K_3 = 50.8$.

$$K = \frac{K_1 + K_2 + K_3}{3} = 68.5$$

² Value of slope is equal to r . — EDITOR.

* 10 Wesleyan Place, Middletown, Conn.

¹ The Dynatron, A. W. Hull, Feb., 1918.

The equation for this particular tube now stands

$$r = \frac{68.5}{I_a} \quad (2)$$

To measure the impedance of a parallel resonant circuit connect the combination in series with the plate lead. Set E_p at the value for which K was calculated, 20 volts in the above example, and vary I_a by varying the filament

current. When $r = \frac{L}{RC}$ oscillations will be set up in the circuit. These oscillations can be detected either by noting the sudden change in the plate current or by listening for a beat note in another local oscillator. The value of I_a at which oscillations just start is substituted in (2) and r is determined. The value of r is also the value of $\frac{L}{RC}$ or the impedance of the parallel circuit.

The impedance of choke coils at approximately their natural period can be determined in exactly the same manner. The plate to screen grid capacity of the tube is approximately 12 μufd . and this is effective across the coil. For coils with low capacity this becomes a factor which cannot be neglected.

AN UNUSUAL R.F. CHOKE

W. D. Smith, W6DOI, of San Diego, California, has spent a great deal of time experimenting with r.f. chokes, and has finally arrived at a design which seems to be "holeproof" over the entire frequency range from 200 kc. to 28,000 kc. But let him tell it in his own words:

"The subject of r.f. chokes, after having been discussed again and again, is, as far as I am able

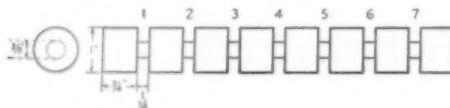


FIG. 2

All sections are wound in the same direction, with No. 28 enamelled wire. Turns in each slot are as follows:

Slot No. 1 — 313 turns	Slot No. 5 — 331 turns
" " 2 — 131 "	" " 6 — 161 "
" " 3 — 293 "	" " 7 — 293 "
" " 4 — 113 "	

The winding in slot No. 1 is the hot end of the choke, No. 7 going to the supply line.

to determine, still as hazy, elusive, and unsolved as ever.

"Did you ever see a Hartley-circuit grid dip meter capable of constant frequency change from 30 megacycles to less than 100 kc., with constant output, and without holes? This undoubtedly brings to your mind the subject of r.f. chokes. Such a meter is more than a possibility as I am possessed of one, designed and built by myself.

"About three years ago I undertook a study of r.f. chokes and their action for my own edifica-

tion, and after endless experimentation and measurements incident thereto, evolved a theory which to date seems to be watertight, and provides chokes for any frequency up to their overall fundamental frequency — which may be so low that it is of no practical consequence from a radio standpoint.

"This system consists of a series of pie-wound sections on a straight-line form, with determinations of component sections as follows: Section at load end — resonant period approximately one-third of signal frequency; the inductance, expressed in m.h., to be a prime number; next section — same construction, except inductance value prime and resonant at one-seventh of signal frequency, spaced on the form in such a manner that the mutual inductance between the two sections is not greater than one-half the inductance of the load section; these are followed by five other sections of the same coupling, but each maintained in prime inductive relation to every other section in the choke. Wire size and dimensions of the form will necessarily be governed by the load requirements of the d.c. circuit to be fed.

"Applying this theory to ham use, unless you are possessed of more rapid methods of calculation than I, entails a vast area of paper and a number of good pencils, together with quite a lot of patience. However, I have found that a much more simple method of calculation, and one that works with entire satisfaction from the ham standpoint, may be used. This has been proved to my satisfaction by risking my thermo-galvanometer, tightly coupled to the outside end of my choke on a 1/4-kw. oscillator while it was continuously varied in frequency from 28,000 kc (the highest frequency at which it would oscillate), to 200 kc., with a maximum deflection of less than 1.5 m.a. over the entire frequency range.

"The amateur version consists of coupling the sections on the form not closer than 1 1/4 times the mean coil diameter, and maintaining the number of turns in each section in prime relation to each other. I have built and used hundreds of these chokes since the original design was evolved, and have found an invariable gain in efficiency when they have been used to replace other chokes of whatever type or design.

"A sketch of the usual choke used in any r.f. transmitting circuit intended for power outputs of less than 1/2 kw. and frequencies of 500 kc. or more is shown in Fig. 2."

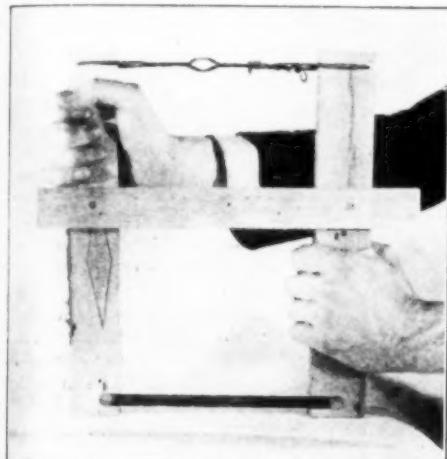
A PANEL SAW

The chap who gave birth to this idea is too modest — or sensitive — to let us mention his name. In spite of this deprecatory attitude, however, the gadget is a handy one for taking care of a mean job, namely, sawing panels.

How many of us have wanted to saw through a foot or so of sheet bakelite and wished the hack-

saw manufacturers had been a little more generous with the space between the brace and the blade? Well, why not make a special saw for the job? The only materials necessary are three pieces of wood, a hacksaw blade, a few feet of wire, and some nails. It's as simple as the accompanying photograph.

The wood pieces used should be heavy enough not to bend when the saw is in operation, and the distance between the saw blade and the cross piece must be sufficient for the job in hand. Tension on the blade is regulated by twisting the wire after the manner of a turnbuckle, a heavy screwdriver being the "twister." As a matter of fact, if a "high-hat" job is wanted a turnbuckle could be placed in the wire, and the whole thing



A PANEL SAW

could be dressed up a bit. One made out of odds and ends works just as well, however.

A HANDY WAY TO LAY OUT COILS

Since the coils for an amateur-band receiver always have to be made to order, it is quite an advantage to have a coil form which can be used for experimental coils only. Bob Chipman, VE4IC, of Winnipeg, Canada, took an old tube base and mounted four binding posts on it, each of the posts being connected to a prong in the base. Small machine screws and nuts will do just as well. A sketch of the idea is shown in Fig. 3.

This base is used only during the cut and try process, and after the proper number of turns for both tuning coil and tickler have been determined for any particular band a separate coil is made up in permanent form on another base. This does away with the bother of soldering and unsoldering wires in the pins, pushing the wire through holes in the base each time a turn is removed, and other time-wasting maneuvers which cannot be avoided unless a special base such as this is used.

The device has another advantage, because

other types of coils which will not fit in the pocket in a tube-base coil receiver may be tried out by

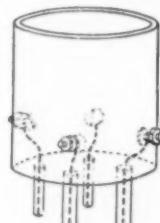


FIG. 3

simply running wires from the coil terminals to the binding posts on the base.

ELIMINATING KEY CLICKS

We should very much like to think that the key-click problem has been solved to everyone's satisfaction, but unfortunately it hasn't. Thumps very often refuse to yield to rational treatment, much to the disgust of both amateur and B.C.L., and then sometimes a simple stunt will be hit upon which restores peace in the neighborhood. While the methods described below may not fall in this class, they have been successful in each individual case, and will be worth a trial, whether or not other means have failed.

Robert T. Foreman, W9ZZE, of Tucson, Arizona, had a lot of trouble with an a.c. broadcast receiver, and after trying all sorts of thump filters and wave traps, finally resorted to a filter in the supply line to the broadcast receiver. When this filter was installed, the clicks could no longer be heard.

The wiring of the filter is shown in Fig. 4. The inductances are old Ford spark coil primaries, and the condensers are .005 μ fd. each. The filter is placed as close to the receiver as possible — in this case it was mounted in the same cabinet. If

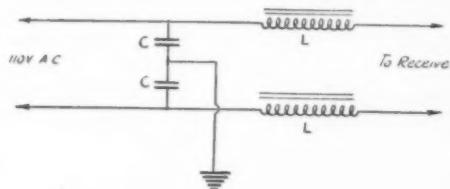


FIG. 4

*L — Primary of Ford spark coil (vibrator must be shorted out if primary is not removed from coil assembly).
C — .005 μ fd.*

compactness is wanted, the primaries can be removed of course from the coils.

When the key is placed in the primary of the plate transformer there is usually not so much trouble from clicks caused by a steep r.f. wave

front, but breaking the primary current gives the same effect in an a.c. receiver as turning a lamp on the same line on or off. An arrangement which eliminates the spark at the key thus serves the double purpose of reducing this effect and saving the key contacts. WSAQ, E. H. Gibbs, Wadsworth, Ohio, had this trouble, and found an inexpensive solution for it.

R.f. chokes are placed on each side of the key, and a .5 μ fd. condenser is shunted around them. The condenser absorbs the spark, and the chokes "wash out" any high-frequency currents which may be set up. A diagram of the arrangement is shown in Fig. 5.

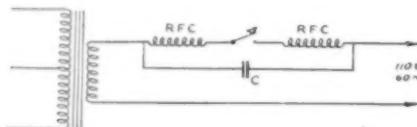


FIG. 5

RFC — 150 turns of No. 24 d.c.c. on 1-inch form. Larger wire should be used if the transformer draws more than about 75 watts.
C — .5 μ fd.

The chokes must be wound with wire which is heavy enough to pass the primary current of the plate transformer without too much voltage drop. No. 24 is large enough for a set using a single Type '10 tube. Higher powers will take a proportionately larger wire size.

Milton Gilbert, W2BBP, also had some trouble with clicks, and eliminated them by using the circuit shown in Fig. 6. It is a somewhat unorthodox lag-circuit arrangement, but W2BPP says he has had no trouble with clicks since using it.

It is probable that a great deal of the success of an arrangement of this sort is dependent on the adjustment of the transmitter, as is the case with any of the usual lag circuit. With different transmitter adjustments, different values of both choke and condenser will prove most effective. A little experimenting is therefore needed in order to get the best possible results.

THE RESISTANCE BRIDGE IN THE APRIL "X"-SECTION

Mr. Normal Moll, Toledo, Ohio, has called our attention to the fact that the fundamental equations for the resistance bridge given on page 47 of the April issue were set up incorrectly.

These were given as

$$\begin{aligned} E_a &= I_a R_a = I_b R_z \\ E_b &= I_a R_a = I_b R_b \end{aligned}$$

but should have been

$$\begin{aligned} E_a &= I_a R_a = I_b R_a \\ E_b &= I_a R_z = I_b R_b \end{aligned}$$

This makes no difference in the final result, however, because the inequality disappears as

soon as the IR drops are put in the form of a ratio. The statement that $R_z = R_a (R_b / R_a)$ is therefore correct.

Mr. Guy A. Simmons, Jr., of Little Rock, Ark., writes as follows regarding the bridge:

"It might be well to bring out that this type of bridge will be accurate only when non-inductive resistances are being measured. Other resistances are accurate at the frequency of the buzzer being used."

"A refinement which would make the tone obtained from the buzzer smoother and prevent the

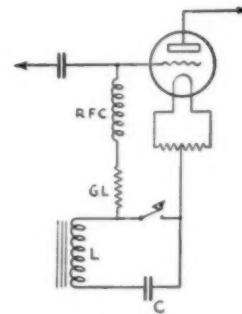


FIG. 6

L — 30-henry B-eliminator choke.
C — .003 μ fd.

bridge from affecting the tone of the buzzer would be to place a large fixed condenser in one of the leads from the buzzer to the arm of the bridge. This would also tend to prevent sparking at the contacts of the buzzer and prolong their life. This condenser should be fairly large, 1 mike or so, in order not to appreciably attenuate the current supplied to the bridge by the buzzer. The condenser used does not have to stand high voltages and could be any low-voltage receiving condenser.

"Many school laboratories use a modification of this type of bridge in which a meter stick with a section of resistance wire stretched its length is used. A fairly high resistance (per foot) wire must necessarily be used. The connections are the same as those in article by Mr. Whitacre, although a battery and galvanometer are usually used."

A NEAT "CLIP" FOR TRANSMITTER COILS

A new use for the National "Grid-grip" is suggested by W1CRC. It makes an excellent "clip" for a copper-tubing transmitter coil, fitting the 3/8-inch size snugly, and can be squeezed together a bit to fit 1/4-inch tubing. The idea is illustrated in Fig. 7.

The grid-grip should be slipped on the coil before the ends are flattened to make connecting lugs. A piece of flexible wire of the required length is soldered to it, and the other end of the wire is soldered in a phone tip. The tip is plugged into a tip-jack, which may be mounted permanently in the transmitter.

In this manner it becomes possible to change coils in a Hartley transmitter, for instance, without readjusting the clip the next time that particular coil is used. The phone tip and jack are used simply for convenience — a binding post would serve equally well, although a little more time would be needed to make connections. The grid-grip makes a good connection — better than an ordinary clip — and in addition has no iron in it. Ordinary clips are usually made of iron or steel and then plated with copper or nickel, and get quite hot even with a low-power set. Unnecessary

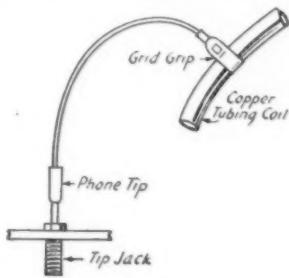


FIG. 7

heating means an unnecessary loss of energy which might better be expended in useful radiation.

A FLEXIBLE RECEIVER

By A. E. Harrison*

THE receiver described is not radically new or very different from most ham receivers, but several ideas have been combined to make it flexible and yet not complicated or expensive. No photographs of the receiver are available, as it has been changed from time to time as different ideas were tested.

The tuning inductance is a variometer. It covers either the 3500-ke. or 7000-ke. band by changing the position of the rotor. The stator has 12 turns, a coil of 6 turns on each side of the shaft, on tubing 2 inches in diameter. The rotor is a short UX tube base with the prongs removed and also has 12 turns. The tickler has 6 turns on both rotor and stator. It is wound next to the shaft with No. 36 d.s.c. wire. This makes an efficient tickler winding but occupies one tenth as much space as larger wire. As shown in the photograph, the variometer was mounted on a '99 tube base in order to replace the tube-base coils formerly used, without changing the set.

This variometer is not completely satisfactory, as it does not include the 14,000-ke. band, and the oscillation control must be changed when changing bands. With an equal number of tickler turns on the rotor and stator, more detector voltage or feed-back capacity is required to cause oscillation as the frequency is increased.

*W6BMS, 1630 Buena Ave., Berkeley, Calif.

This might be remedied by putting more turns on the stator than the rotor or vice versa. A variometer covering three bands may be designed

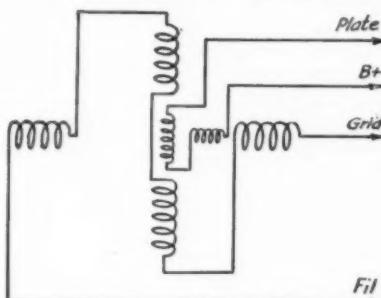


FIG. 8. — WIRING OF THE VARIOMETER

If all coils are wound in the same direction the connections should be made as shown. Further details are given in the text.

with the rotor and stator closer together, using a rotor turned on a lathe and form wound stator coils.

The tuning condenser is a rebuilt "Pilot" midget. The stator plates were removed and a



THE VARIOMETER

portion of one side filed out. This gives the receiver a tuning curve that is nearly straight-line frequency. Three plates were assembled on the stator, then the two screws were cut with a hacksaw about $\frac{1}{6}$ of an inch from the third plate. Threaded bakelite bushings $\frac{1}{4}$ inch thick hold the three plates in place and allow two more plates to be assembled on the stator but insulated from the other three plates. The rotor was not changed.

For 3500-ke. operation five stator plates are used, spreading the band over 50 dial divisions. Only two plates are used for tuning 7000 and 14,000 ke. A switch should be arranged to add the

other three plates to the circuit when tuning 3500 kc.

In the diagram of the receiver, Fig. 9, a Type '99 is shown as a volume control. It is semi-automatic in action, reducing volume on loud signals but allowing weak signals to come in at practically full strength. Another advantage of this control is its action on key clicks from the

in "Photo Cells," by D. E. Replogle, published by the Jenkins Television Co., 346 Claremont Ave., Jersey City, N. J. The booklet explains the action of the various types of cells and gives considerable data on circuits and characteristics, together with information on photo cells marketed by the Jenkins organization. It is in loose-leaf form, and supplementary sheets will be issued from time to time. The price is twenty-five cents.

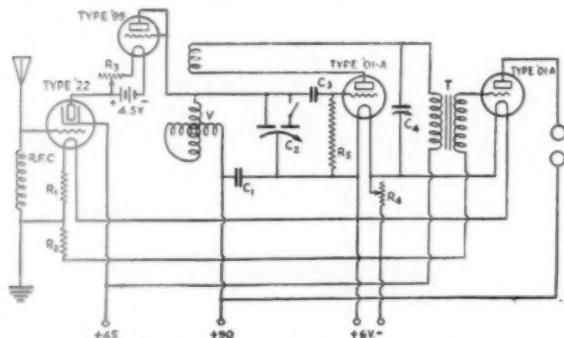


FIG. 9.—THE COMPLETE RECEIVER

V—Variometer described in text.
 C_1 —.006 μ fd.
 C_2 —Tuning condenser described in text.
 C_3 —100 μ fd.
 C_4 —250 μ fd.
 R_1 —10 ohms.
 R_2 —5 ohms.
 R_3 —60-ohm rheostat.
 R_4 —20-ohm rheostat.
 R_5 —2 megohms.
RFC—Short-wave choke.
T—Audio transformer.

transmitter. The shock to the detector is reduced when the key is pressed, allowing better break-in operation. It would probably reduce the interference from a nearby station; however, this has not been checked as operation recently has only been in the 3500-kc. band and no other stations in this neighborhood seem to be using that band. Complete shielding of the receiver would make this control more effective.

Strays

The Jewell Electrical Instrument Company, 1650 Walnut St., Chicago, is publishing a neat little time conversion chart which is a handy adjunct to the radio shack. It is similar to the one described in *QST* some months ago and in the *Handbook*, and it is possible to determine the hour in any part of the world corresponding to a given local time. Provision is also made for finding whether the time indicated is for the same date or not. The chart is being distributed free of charge, and can be obtained by simply addressing a card to the above address.

Amateurs experimenting with television and photo-electric cells will find much to interest them

Most amateurs are addicted to poring over catalogs, and one of the best we have seen recently is the "Catalog and Data Book," published by the Offenbach Electric Company, 1452 Market St., San Francisco. As the name indicates, there is much more in it than just prices on manufactured parts. The book has 370 pages, divided into eighteen sections, each dealing with a class of apparatus, such as condensers, resistors, meters, amateur transmitting and short wave equipment, panels, etc., and with each section there is a great deal of design data and generally useful information on that particular subject.

Nearly all standard brands of apparatus are listed in its pages. The book is well printed on good paper stock, and is well worth the dollar charged for it. It is a handy reference book to have around the station.

If You Buy "QST" On the Newsstand—

Perhaps you haven't previously seen the Communications Department section with its operating news. This section of the magazine, with its news on the practical activities of amateurs all over the country, including your own locality, appears in newsstand copies only during a couple months in midsummer. Normally it is an extra section of 16 pages bound into only those copies which go direct to members of the A.R.R.L.

If you are interested in these informative operating articles and the chatter of local news everywhere, it is one additional reason why you should join the League and have the membership edition of "QST" delivered to your door every month. See the convenient application blank on page 94.

I.A.R.U. NEWS



Devoted to the interests and activities of the

INTERNATIONAL AMATEUR RADIO UNION

Vice-President: C. H. STEWART

Secretary: K. B. WARNER

President: H. P. MAXIM

Headquarters Society:

THE AMERICAN RADIO RELAY LEAGUE, Hartford, Conn.

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Experimenteringe Danske Radiomatorer

Nederlandse Vereeniging voor Internationaal Radio-

amateurisme

New Zealand Association of Radio Transmitters

Norwegian Radio Relay League

Radio Society of Great Britain

Reseau Belge

Reseau Emetteurs Francais

South African Radio Relay League

Wireless Institute of Australia

Conducted by Clinton B. De Soto

WITH this issue of *QST* the task of accumulating and compiling the material which appears regularly in this department falls into new hands. No peroration or lengthy announcement of this change is necessary or desirable, since we are all chiefly interested in the news itself as herein published — not in the personalities behind that news.

We hope mainly to retain that fine degree of real, spirited interest in the information contained in the department which has been evinced by so very many amateurs from all parts of the world. We hope the high standards of fullness in detail, of promptness in preparation, of accuracy in statement which have governed the contributions to these pages in the past by many valued contributors will be maintained and appreciated by all concerned. — *C. B. D.*

Miss Barbara Dunn, G6YL, again contributes another change of address by a QSL Forwarding Bureau. The present address of the Hungarian QSL Bureau is as follows: M.R.A.E., I. Zirkenkanka, Utca 14/B, Budapest.

This will correct and supplement the general list published in the November, 1929 issue of *QST*.

A brief Chinese report carries the information that the power input allowed Hongkong amateurs is 10 watts. They are licensed to work on the 7-, 14-, and 28-mc. bands.

The regular June Calendar of the I.A.R.U. will have been sent out to all the National Sec-

tions just about the time that this issue is published. Another society is being proposed for membership, the *Rede dos Emissores Portugueses*; it is hoped that it will not be long before this organization is welcomed into the Union.

Duly representative national amateur societies which may wish to affiliate with the I.A.R.U. are invited to communicate with the Secretary, at 1711 Park St., Hartford, Conn.

We have received here a good many DX Time Tables which are of value mainly in a very restricted area, and we haven't felt them generally useful enough for publication. If any one is interested in tables for special places and regions we will be glad to give whatever information we have on file. (For example we have a very fine report on Porto Rico and vicinity only. To the K group living there and others interested in working into there it would prove invaluable.) We will be only too glad to answer any inquiries.

AUSTRALIA

By Alan G. Brown, VK3CX

Much activity was shown here during the tests; mainly on 7-mc. band, since the 14-mc. band did not come up to expectations in regards to contact with the U. S. A. Most of the chaps engaged in the tests have the same growl, and that is that there weren't enough W stations participating, because about one in every two stations worked didn't have a test message. Some very fine totals

were run up, but as yet we don't know who will be the winner.

The Victorian Division of the W.I.A. has their club rooms in fine shape now and a loan library of radio instruments and radio books which is a great help to members who want to make certain experiments and yet don't want to buy all the expensive parts necessary.

The Aero Club Division of the Institute is doing very fine work out at the Essendon Aerodrome and working consistently plane to ground with low-power plane sets. The ground station VK3WI is perhaps the most up-to-date station in the whole of Australia. The small plane transmitter working on the bottom edge of the 42-meter band under the call VK3WT has been heard at least 1000 miles away when the plane was in the air, with an input of only 3 watts.

All the interstate divisions of the W.I.A. have their own stations on the air regularly now. The calls are: VK2WI, VK3WI, VK4WI, VK5WI, VK6WI, VK7WI. Practically all are crystal-controlled and they handle much of the Institute traffic, thus saving much correspondence and bringing divisions closer together.

On the 14-mc. band a few of the old-timers and some new hams are all out after DX and at present getting plenty of it. With inputs ranging from 3 to 30 watts they are working all continents regularly with little trouble.

BELGIAN SECTION

By Paul de Neck, Pres., Reseau Belge

The DX period seems to have come back on the 14-mc. band, and every day, from 1700 to 2300 G.C.T. a fierce traffic is being carried. New Zealanders and Aussies come first, together with a few South African and Rhodesian stations. After this the great lot of U. S. hams from the 1, 2, 3, 8, and 9th districts literally cover the scale. Later come the South Americans, mostly LU and PY, with a few CX and CE. We can again find our good friend CE7AA, who came through a few days ago.

Of the few records to be listed:

ON4JJ had his 14-mc. 'phone received in Australasia.

ON4BZ and ON4UU made their first Japanese QSO.

ON4HP achieved his code WAC in one night.

ON4OR made his first U. S. A. contact with only 3 watts input.

On the 7-mc. band the regular traffic was handled between European stations and a few Americans.

ON4JQ, with 40 watts input on 7 mc., was received on 'phone in Europe with a regular QRK R8.

We note with sadness the sudden death of one of our best friends in Europe, SU8AN, Mr.

Nahmias of Cairo. He was certainly one of the best known amateurs in our country, and the first DX made by a lot of us in our first attempt to quit the continental area.

Many ON's had good chats with SP3YL and SP3KYL. We know now that these stations are owned by two young girls, movie stars of their own country. Splendid! Hi!

Our SP friends tell us that there are six YL's in the L.K.K. gang right now: SP3HR, SP3IA, SP3IA, SP3HB, SP3KYL, and SP3YL. Let us try to get them on the 'phone sets, OB's!

Now, could we say something about the new WAC Certificates? Why not register and classify



VS6AG. THE STATION OF J. J. ALVAREZ, 6 CAMERON ROAD, KOWLOON, HONGKONG. THIS STATION FIRST CAME ON THE AIR NOVEMBER 2, 1929, AND HAS SINCE WORKED ALL CONTINENTS AND 22 COUNTRIES, WITH A TOTAL OF 190 STATIONS

The transmitter uses one Type 210 in an Ultraudion hookup. The transmitting antenna is a voltage-fed Hertz, as described by Mr. Windom in QST for September, 1929. The receiver is an ordinary Schnell detector and one-stage audio using tube base coils.

these certificates at the date of receipt of the last QSL card bringing their proofs? It would be much more correct than the actual method of listing them by the time of their delivery.

For the old ones, our friend Mr. K. B. Warner could ask the national sections interested to send a paper giving again the said date, after which he sends back a small label with this date written on together with the I.A.R.U. seal and his signature, the label to be affixed on the WAC certificate by its owner.

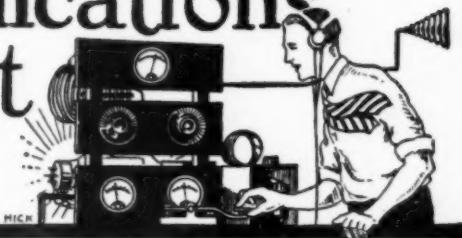
The preparations for our July International Amateur Congress are going strong. We have the official authorization to install two 100-watt 'phone and code sets, one in Liege and one in Antwerp, working in the 40- and 85-meter bands during the period of the exhibitions.

In regard to the suggestions regarding the dating of WAC Certificates as advanced by Mr.

(Continued on page 66)

The Communications Department

F. E. Handy, Communications Manager
E. L. Battey, Asst. Coms. Mgr.
1711 Park St., Hartford, Conn.



Your Log

By Eugene A. Hubbell *

"OA4J, why that's funny, I don't remember calling him. Let's see, he says 'Sorry you didn't hear me come back to your call. Your signals very nice, QSA3, here.' I wonder what the log-book shows for that night."

The log-book showed nothing in the way of operation for that night. So our "ham" friend went in doubt the rest of his days as to whether that card really belonged to him, or to another station. The up-to-the-minute station owner could tell in a minute whether he had called OA4J that night, and would be absolutely certain as to whether the card was rightfully his.

A log-book is usually found in every amateur station, but in how many logs can an entry be found of a call not answered, a CQ without replies? Few keep a record of these transmissions, yet it should be done. IF THE LOG IS TO BE COMPLETE! A complete log is the careful record of all transmissions from the station to which it belongs, with associated data. The Federal Radio Commission has adopted new amateur regulations which make it imperative that every station keep such a record.

A log-book furnishes a record of stations worked, first of all, with date and time. Then it should give the frequency or

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and "no," consequently their use fixes their meaning more firmly in our minds, and shortens the work considerably.

The second item records a CQ which went unanswered, but which might possibly have been heard and answered, although the sending station did not know it. If a card comes in from Himalaya, Timbuktu, or Java, one can immediately verify the transmission. The third entry records the transmission made while tuning the antenna circuit after a QSY to 7 mc. Too many times a station tunes up the antenna circuit and sends test for minutes at a time without signing. When through testing, SIGN YOUR CALL signal.

The fourth item records a call which went unanswered again. However, it furnishes valuable information. Perhaps some Official Observer sends you a card saying you were heard off-frequency on the 7-mc. band June first, at 7:00 p.m. CST, calling CQ. Your log at once furnishes the information you were transmitting at that time, but that you were NOT calling CQ. Information of this kind may prove to be very valuable in saving your license, for the time is near at hand when off-frequency transmission will meet prompt punishment.

It is up to each amateur to dope out his own system. This gives an idea of the writer's conception of a complete and accurate log, that may be kept with a minimum of work, recording every transmission. Whether you use this form or

Date	Time	Called	QSO	QSL	My	Signals		Input†	Freq.†
						His	Remarks		
6-1	0010	HC1FG	C	6-1	DC4	RAC4	rainy	45w	14 mc.
6-1	0030	CQ	N					45w	14 mc.
6-1	0040	Test					† QSY to	60w	7 mc.
6-1	0100	WSBH2	N			XDC4	7 mc.	60w	7 mc.

frequency band, on which the station was worked, and as required by the F.R.C., the input power to the final stage of the transmitter. It should also contain a record of tests not, when tuning the transmitter, providing the antenna was coupled, also all unanswered calls and CQs. Optional items are records of signal strengths, weather, whether QSL was sent or received, traffic handled, etc. It should be comparatively simple to keep and entries should be easily made. A sample form for such a log is indicated herewith.

The first entry records the working of HC1FG on June 1, at 0010 GMT, the C under QSO indicating contact was made and a QSL was sent the same day. Under signals the station calling received a report of DC, QSA4, while HC1FG's signals are given as RAC, QSA4. The weather was rainy, input to the transmitter was 45 watts and the frequency was the 14-mc. band. A letter can be used to indicate the band, A for 1750 kc., B for 3500 kc., etc. The signal reports may be cut to a few indicating letters and figures, thus: AC, RAC, NDC, DC for corresponding modulation, or lack of modulation, on the signal, while simply 1, 2, 3, 4 and 5 indicate the degree of reliability or signal strength (QSA) and the audibility (R1, etc.) if asked. Under the QSO column, C and N are international abbreviations for "yes"

another, keep a complete log, and mark yourself down as operator of a truly modern station operated systematically and legally in every respect. You will find the record valuable on many occasions.

WDDE

Paul K. Davis of Chicago (W9ADU) will operate WDDE this year, and he plans to contact amateurs on 5555, 8330 and 11,110 kc. The expedition and MacMillan's schooner *Bowdoin* set forth in mid-June. The party will visit Labrador, Greenland, and Iceland. Jenkins and Adair, Inc., of Chicago have built the new high-frequency equipment for WDDE.

About the time this notice appears in print we expect to be able to include later and more specific information in telegraphic broadcasts from Headquarters concerning the

† A suggestion to eliminate the necessity for columns for the frequency and input power is to write a statement including both these items across the whole page, opposite the time entry, each time the change is made to a different transmitter or different operating frequency. — F. E. H.

† C, W, and H are often used to denote "called," "worked" or "heard" respectively. — F. E. H.

* W9ERU, 227 N. 4th St., Rockford, Ill.

frequencies and operating hours of WDDE. Davis asks your cooperation in handling this traffic through general amateur contacts and schedules with the stations that prove



most consistent. We must look for WDDE outside the regular amateur channels (where all *bona fide* expeditions are now licensed) and do the usual good communication job. Plan to contact WDDE and help all you can!

Traffic Briefs

In two months on 14 mc. W1AMQ contacted 40 states, all U. S. districts, Canadian fourth district, four continents and eleven countries. FB!

A route known as the "Oriental" extends from Paris, France, to Shanghai, China, and is lined up as follows: KA1DJ-W6AD-W9COS-WSYA-W3BF. W2ZC is transatlantic station for the route and completes it to England, France and Berlin. Traffic for the Orient is cleared through the Philippines. This route functions daily and at this writing is one of our most reliable chains.

WSAJC says, "A sked East beats a CQ East by about three days."

Mrs. N. M. Adams of Klamath Falls, Oregon, was very pleased to receive a Mother's Day greeting by amateur radio from her son, who is stationed at Tientsin, China. W6BSQ, who delivered the message, says that the letter of appreciation and thanks he received from Mrs. Adams surely makes one realize that *deliveries count!*

When the ships of the combined Battle Fleet and Scouting Fleet, U. S. N., terminated maneuvers for a recreation period in various ports of the West Indies, amateurs in the Porto Rico-Virgin Island section saw an opportunity to obtain traffic — and lots of it. K4KD at St. Thomas, V. I., manned by operators of NBB, got most of it as the majority of the vessels were in that port. KAAKV at Ponce had three battleships in his port. K4KD, not being at a port of visit, sent a message to the commander of the Scouting Fleet offering the facilities of his station for message service to the United States. The commander forwarded the invitation to all the other ships, and some 100 messages were received at K4KD as a result. K4KD handled most of his traffic on regular schedules with W1MK and W2FN. W4DK gave K4KD his traffic on schedule. At one time W1MK took 23 messages in a string from K4KD, and on another occasion took 52 in a row. On different occasions W2FN took 31, 55, 84 and 108 in a string. All traffic was handled on the 7-mc. band.

K4KD tells us that a very fine time conversion chart for the DX man is obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. This is known as "Standard Time Conversion Chart," miscellaneous publication No. 84, and may be procured at 10 cents per copy, cash only, no stamps accepted.

W9CSR received the first Amateur Extra First ticket issued in Colorado.

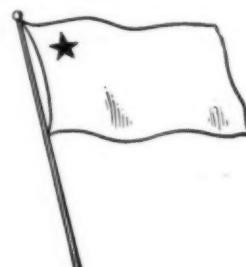
W9CKQ and VK5HG have a total of 365 QSOs to date, their schedule having extended over a period of a year and a half! They are at present engaged in handling traffic to Washington, D. C., for the Magnetic Observatory of the Department of Terrestrial Magnetism, Carnegie Institute at Watheroo, West Australia. The route is VK6MQ-VK5HG-W9CKQ-mail.

We wish to report the following brief sketches of amateur cooperation with the Connecticut National Guard 113th Observation Squadron flight from Hartford, Conn., to Miami, Fla., and return. At Hartford W1MK was on the job. W4MF at Jacksonville handled a number of messages and reports for the fliers and entertained them during their stay in that city. The Miami Amateur Radio Club sent messages filed with them by Western Union to W4AGR at Tampa for relay, as all of their stations were tied up in connection with their cooperation at the All-American Air Races. WSDBK, WSDSN and WSQU were on the job at Dayton to take care of messages that the Squadron wished to send from that city. At Cleveland WSACR and WSBF cooperated.

Traffic Summaries

(APRIL-MAY)

Pacific led by Los Angeles	12,029
Atlantic led by Western Pennsylvania	2952
New England led by Eastern Massachusetts	2316
Hudson led by Eastern New York	1982
Central led by Illinois	1827
Southeastern led by Florida	1566
Midwest led by Missouri	1457
Dakota led by Southern Minnesota	1443
West Gulf led by Northern Texas	1115
Northwestern led by Oregon	788
Delta led by Mississippi	553
Roanoke led by Virginia	247
Rocky Mountain led by Utah-Wyoming	135
Quebec	123
Vanalta led by British Columbia	103
Ontario	90
Prairie led by Saskatchewan	60
586 stations originated 7042; delivered 6190; relayed 15,554; total 28,786, (88% del.)	40 N de ha be fr "P th Ho ma Ti si



Los Angeles retains its hold on the Banner with a total of 3186! This can't go on forever! The Traffic Banner goes each month to the section with the largest total of real messages. A traffic summary showing the standing of the various divisions for the past month is printed above. What place does yours take? What Section will carry the Banner next month and help its Division head the list?

Communications Manager, A.R.R.L.
1711 Park St., Hartford, Conn.

We, the undersigned members of the A.R.R.L. residing in the Section of the Division hereby nominate as candidate for Section Communications Manager for this Section for the next two-year term of office.

(Five or more signatures of A.R.R.L. members are required.) The candidate and five or more signers must be League members in good standing and the candidate must be the qualified holder of a Communications Department, Official Relay Station appointment or the petition will be thrown out as invalid. The complete name, address, and station call of the candidate should be included. All such petitions must be filed at the headquarters office of the League, 1711 Park St., Hartford, Conn., by noon on the closing date given for receipt of nominating petitions. There is no limit on the number of petitions that may be filed, but no member shall sign more than one such petition. 4. Members are urged to take initiative immediately, filing petitions for the officials for each Section listed above. This is your opportunity to put the man of your choice in office to carry on the work of the organization in your Section.

—F. E. Handy, Communications Manager.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections on or before the closing dates that had been announced for receipt of such petitions.

DIVISIONAL REPORTS

ATLANTIC DIVISION

SOUTHERN NEW JERSEY — SCM, Bayard Allen, W3ATJ — W3DH will QRT in June until the University reopens in September. W3ATJ handled a few from Porto Rico. W3UT is ready for the tests on 28 mc. W3ACX will have a portable under shadow of WSC's mast this summer. W3HS, an old-timer, is back using 7 mc. exclusively. W3ARP and W3WW, both opn at WPG, have QRM from the BC studio. W3KJ has installed push-pull. W3ASG has become a 'phone addict. W3BUF hooked his first Hawaiian. W3BVG has gone to the Moody Bible Institute in Chicago. W3ADL is kicking out FB with a new 82 on 7 mc. W3ATV is a new op in Ocean City. W3AWJ is on 14 and 7 mc. W3AS is on at a new QRA. W3AIU has been on a three-weeks' visit to N. Y. C. W3BAN, with no current available in his home, has rigged up a 110-volt magneto to a sewing machine, and is stepping on it. W3BWJ is heard occasionally on 14 mc. W3AWL has applied for ORS appointment.

Traffic: W3DH 132, W3ATJ 54, W3UT 21, W3AWL 6, W3ASG 39.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Forrest Calhoun, W3BBW — If any of you want your ORS put in storage for the summer, say so and then you will be safe from cancellation. Maryland: W3CGC leads this state in traffic: W3AIL, a new one in Cumberland, sent in a nice total. W3LA is experimenting with Airplane Xmitters. W3AFF says QRN is messing up everything. W3AOO got a new 210, and blew it, so is back with a 112. W3BBW is experimenting with voltage feed hertz. W3GF is trying for a commercial ticket. W3BCX and W3DG are going to experiment with television this summer. W3NY will QSP anywhere in South America. W3VJ has a code class and club going fb. W3BBF is a new Baltimore ham using a 560 on 14,000 kc. Delaware: W3ALQ leads this state with a very low total. W3AJH says he can't hear anything but QRN on 7 mc. W3HC reports several new ones in Delaware. District of Columbia: W3BBT still sends in his usual load. W3BF says the leaves on the trees absorb lots of his radiation. W3PM has an A.C. receiver perking. W3CDQ said the Washington Radio Club banquet was a "wow." Vice President Stewart of A.R.R.L. and Paul M. Segal, Rocky Mountain Division Director, attended. W3GT is trying to get on 28 mc. W3OZ nearly missed this report.

Traffic: W3BBT 540, W3BF 103, W3CGC 42, W3PM 25, W3AIL 16, W3LA 15, W3AFF 11, W3CDQ 8, W3ALQ 4, W3BBW 3, W3AOO 3, W3AJH 2, W3HC 1, W3OZ 38.

EASTERN PENNSYLVANIA — SCM, Don Lusk, W3ZF — During the past month the SCM has been extremely busy because of a new arrival (a YL opr). W8VD's doctor forbids him to follow radio as a hobby, but you will find him on most every Monday Eve. If some one could find

tions. As provided by our Constitution and By-Laws, when but one candidate is named in one or more valid nominating petitions, this candidate shall be declared elected. Accordingly, election certificates have been mailed to the following officials, the term of office starting on the date given.

Quebec	Alphy Blais, VE2AC	Jan. 21, 1930
Alberta	Fred Barron, VE4EC	Jan. 21, 1930
Saskatchewan	W. J. Pickering, VE4FC	May 15, 1930
Nevada	Keston L. Ramsey, W6EAD	May 15, 1930
Southern N. J.	Bayard Allen, W3ATJ	May 15, 1930

In the Northern Texas Section of the West Gulf Division, Roy Lee Taylor, W5RJ, J. H. Robinson, Jr., W5BG, and John Adams, W5H, were nominated. Mr. Taylor received 24 votes, Mr. Robinson 21 votes, and Mr. Adams 8 votes. Mr. Taylor's term of office began April 25, 1930.

In the North Dakota Section of the Dakota Division, Guy L. Ottlinger, W9BVF, and Wellesley Beeman, W9DFG, were nominated. The first ballot was held in a tie vote, a second set of ballots were distributed. Mr. Ottlinger received 21 votes, and Mr. Beeman 14 votes. Mr. Ottlinger's term of office began April 25, 1930.

In the Western New York Section of the Atlantic Division, John R. Blum, W3CKC, and Don Farrell, W5DSP, were nominated. Mr. Blum received 89 votes, and Mr. Farrell 58 votes. Mr. Blum took office May 15, 1930.

In the Wisconsin Section of the Central Division, C. N. Crapo, W9VD, and A. D. Sandal, W9AZN, were nominated. Mr. Crapo received 45 votes, and Mr. Sandal 28 votes. Mr. Crapo's term of office begins July 1, 1930.

a solution for W3AKB's MOPA, she will be his sked any ole day. The SCM takes pride in W3MC's fine showing in both traffic and 00 reports. W3AUR evidently is in earnest about his ORS and is now eligible. Ditto to W3UH, who reported by telephone. A word of warning is issued to those who fail to report next month and thereafter: Cancellations are in order and the following will be crossed off unless satisfactory explanations are forthcoming: W3LC, W3NF, W3TB, W8DHT, W8AWO, WSCWO, W3UX, and several prospective non-ORS will have to start all over again unless action is taken immediately. W3AQN is moving to Canada and promises all 'phone men report. His address will be care MacLaren Dam, Via Buckingham P. O., Quebec, Canada. W3EUB rebuilt his haywire into a glass cabinet. W3ZF is coming back to Xtl after eussing a self-excited rig that went bluey.

Traffic: W3ZF 227, W3UH 85, W3MC 89, W3EUB 34, W3AUR 28, W3AKB 6, W8VD 6, W3DZ 5.

WESTERN PENNSYLVANIA — SCM, A. W. Me-Auly, W5CEO — WSYA, in spite of poor radio weather, maintains 16 schedules and the Section Leadership. W5DLG is still going strong. W5CEO has schedules with two Directors and W1MK. W5CNZ is on 7000 kc. after midnight. W8CMP is building a new transmitter. W5DUT is on Sundays. W8AGO wants a Friday schedule. W5BQR, of State College, will be at his home station, W3AHZ, during the summer vacation. W8ARC works the Division Director on A.-A. sked. W8AVY is on consistently. W8DKS and W8AWR are active in Uniontown. W8BRM is moving. W8APQ is troubled with QSX. Reports are still coming in from W8CFR in Rio de Janeiro. W8GU and W8KD will keep a schedule with W8CMP until after the convention. A Naval-Amateur Reserve unit is in the process of formation in Erie. W8CLQ has been released, and Heck is going after two-letter call. W8ASE says he can check frequency to about 3 kc. J. M. Gates, an invalid in South Fork, Pa., is studying the Code and is planning to build a transmitter. W8OB has moved. The SCM would like to have his new address. W8CGY wants to try for an ORS. All hams should watch for the Standard Frequency schedules announced in *QST*, and copy the signals.

Traffic: WSYA 858, W8DLG 154, W5CEO 62, W5CNZ 23, W8CMP 17, W5DUT 11, W8DKS 9, W8AGO 3, W8BQR 37, W8APQ 19, W8AVY 18, W8AWR 11.

WESTERN NEW YORK — Acting SCM, J. R. Blum, W3CKC — W8CPC has skeds with Porto Rico. W8AFM should send a description of his station to headquarters. W8DDL is moving for the summer. W8CUT is having wonderful success with A.C. receivers. W8CYG is experimenting with antennae. W8BOX is back on the air. W8DME uses XTAL on all bands. W8IH is getting out fine with his high-powered fone. W8DXE is home from the Navy for a few days. W8DSP has two XTALS on 3.5 mc. with a push-

pull amplifier. WSBJO has a complete new xmitter. WSBLP is active again for the summer. WSDEJ is a Y.L. op. WSDSA has application in for O.R.S. WSABQ receives some very FB letters from hams. WSBGV is on 14 and 3.5 mc. WSBAV reports the activities of the Jamestown gang. The Jamestown Amateur Radio Association is now affiliated with the A.R.R.L. WSAVM is rebuilding. WSAWM is blowing apparatus. Hi. WSBIF is awaiting receipt of new station license. WSBUT and WSCLB are on more or less. WSCMN is in a sanatorium at Dansville. WSNW is active. WSBAV is off forever — at its present location. WSBYD has fairly good results with his 112 on 4 and 7.3 me. WSNW, WSAVM, WSBIF and WSBUT received their first-class operator's licenses at Buffalo. Annual Meeting — R.A.W.N.Y. The Buffalo Club or R.A.W.N.Y. held its annual meeting at the Hotel Sagamore in Rochester on April 26. T. W. Connette, WSAFM, acted as chairman and introduced the speakers as follows: Dr. Grinnell, U. S. Radio Inspector, who spoke on Standards of Frequency. WSCKC gave a campaign speech. John Long of WHAM told of his work on 50 me. Mr. Robert S. Burnap of the R.C.A. told of the efficiency of the 224 as a detector for the higher frequencies. Mr. R. B. Dome of G. E. told about the short wave antennae at Schenectady. Ralph Rieman led a discussion on the aforementioned sky wires. The R.A.W.N.Y. wishes to go on record as having sponsored and held the largest unofficial meeting or convention in the East. There were 102 present including several members of the Snarks — an affiliated club in Western N.Y. Credit of this meeting should be given to T. W. Connette and Johnnie Miller of WSAFM.

Traffic: WSAFM 1, WSBJO 61, WSCPC 24, WSCSW 0, WSBLP 0, WSDSP 26, WSCRC 25, WSDSA 36.

CENTRAL DIVISION

INDIANA — SCM, D. J. Angus, W9CYQ — The Fort Wayne Radio Club is going to have a big picnic, June 21st and 22nd, at Lake George. The Navy gang at Fort Wayne are going to put in a new radio station for drill work. W9AEL, W9FHZ and W9FVY are new stations at Fort Wayne. W9GFJ moved and had his station going before the furniture had all been moved. Hi. W9ETH, W9DWL, and W9BHM have changed to Xtal in the last month. W9BWI is on the air after a month of rebuilding. W9CVX is increasing power. W9COI is in New Mexico for his health. W9RW is building new receivers. W9AOO is going well with a 50 on 7000 kc. W9FXM is back from the hospital and wants a Michigan schedule. W9EPH sends in a report for the Richmond gang.

Traffic: W9AIP 23, W9GJJ 22, W9GCO 7, W9AKJ 22, W9BKI 10, W9GJS 20, W9AOO 6, W9CWS 26, W9CMQ 2.

ILLINOIS — SCM, F. J. Hinds, W9APY — W9FBT has installed another 250 on his fone set. W9CSP is now on 7000 kc. Fireworks were displayed at W9EHQ when they forgot to cut in a primary resistance in the 1000-volt transformer on a 210. Hi. W9ACH is exploring the 14,000-ke. band. W9ANX blew his filter and is staying off until things are fixed. W9DLV uses 2 201A's with fine success. W9BNL and W9FIE have made application for ORS. W9BNL has been handling traffic from Hawaii and Guam via relay on west coast. The Centralia hams had a portable fone on a hamfest picnic 15 miles from town, and kept in touch with the home base all the time. W9ASY and W9APY each have new screen-grid sets going nicely. Illinois Bell Telephone Radio Club has a code class of 17 new prospective hams. W9BDW was QSO W9FAT and took traffic. W9TJ is back in Chicago and will start up an outfit under W9PK. W9ERU has been spending his time on 7- and 14-mc. bands. W9DSS has quit blowing blocking condensers and has taken to blowing transformers. Hi. W9FFQ worked Africa with his 210. W9BXB is building a new transmitter. W9BAI has a remote control outfit. W9PA has a new typewriter, so things may go faster there when he gets up speed. W9BEF has heard plenty of DX on 14 me., but has been unable to work any. W9CPY, W9BIH, W9BOY, W9FFR, W9AGT, and W9BEF had a two and a half hour fone QSO together one Sunday morning. W9KA is moving again. W9CKZ is building a new AC receiver. W9GJJ graduates from school this month. W9GIV says, "My Kingdom for a Crystal." W9BNI has a crystal, but won't take a kingdom for it.

W9DGK is in the experimenting mood. W9ALZ was married this month. W9AKA and W9TQ will soon step off into the unknown realms of married life. W9DOX has been trying to find why his set is QSK. W9EGY received a QSL from Budapest, Hungary, reporting his 3500-ke. signals. W9BZO threatens to drag his crystal down to 28 me. W9ACU is still working 7- and 14-mc. bands with his 171-A and 180 volts of B batts. W9FCW is remodeling the outfit into a nice cabinet. W9AAE is erecting a new mast for the business end of his new MOPA. W9FPN and W9LL are busy with exams. W9FPN desires schedules with 28-mc. stations. W9AFF is on 14 me. and finds things slow. W9DCK has been on 3500 fone lately. W9CZL reports traffic and DX fine on the 7-me. band. W9AFN is R9 with the BCL's. W9BIR is starting in business. Reception is poor at W9BVP. W9CNY is overhauling. W9FDJ is using the W9BYC circuit in May QST and says, "How it does work."

Traffic: W9DZM 146, W9BVP 65, W9CKZ 50, W9CZL 31, W9AMO 25, W9ASY 24, W9DGK 23, W9BZO 20, W9BNL 19, W9FCW 16, W9LL 13, W9FDJ 10, W9PA 10, W9DCK 9, W9AFN 8, W9ACU 7, W9APY 7, W9BIR 7, W9CUH 7, W9GIV 7, W9KA 4, W9AKA 3, W9BDW 3, W9ERU 3, W9BMQ 2, W9CNY 1, W9FPN 1.

OHIO — SCM, H. C. Storck, WSBYN — All of us are looking forward to the coming convention at Dayton. WSCNO still leads the section. WSBAC comes second, and says he has been mostly on 14 me. W8NQ voices the common complaint, radio conditions rotten and schedules nonexistent. WSBKM says the same. WSAQ is having 'phone QRM. WSCSS has been trying his hand at 'phone. WSCFT wonders how many of these 'phone men ever saw a telegraph key. WSBBH has his crystal rig going. WSADS says he has been sick. WSTK says that if QRN does not soon stop there is going to be another ham set listed in the ham ads. WSEJ advises that he is getting things together for crystal control. WSDMX cannot understand why stations make schedules and then fail to keep them. WSAPC has about given up the ship until QRN lets down. WSBBR is still on the sick list. WSCX has a good formulae concerning YLs and DX, best yet. Hi. WSBRB is a newcomer. WSBDU reports the Naval Reserve unit coming fine up his way. WSBEA is still going strong. WSPL says air has been dead. WSHH has nothing to say for himself. WSBBL will be on the air from Georgia, 1st of August, with portable call W8ZCC. We have a new ham with us in the person of J. W. Hardesty, WSDAI, an old Morse man. WSJC recently moved to Dayton, but he keeps the set on the air. WSCFL says his main trouble is with "A" batteries. WSBZL is quite active in tests, and adds his vote in favor of a public list of off-wave offenders. We lose WSRN again. He is on KFNA. He reminds me of the old song about "On again, off again, gone again, Finnegan." Hi. W8IF has been off the air on account battery trouble. WSBYN has also been off the air as he has been away from home.

Traffic: WSCNO 86, WSBAC 48, WSNP 41, WSBKM 34, WSAQ 26, WSCSS 23, WSCFT 22, WSBBH 22, WSADS 16, WSTK 16, WSEJ 10, WSDMX 7, WSAPC 7, WSBBR 6, WSCX 6, WSBRB 4, WSBDU 4, WSBEA 4, WSPL 3, WSHH 2.

KENTUCKY — SCM, J. B. Wathen III, W9BAZ — What goes on here? Few reports and low totals. We can't all be winners, but our place is to show 'em that Kentuckians are Thoroughbreds! Lean on those keys. W9OX staggered over the line to win his second lap. Tied with W9AZY at two all. W9BAN took a flyer, but fell a trifle short. W9FZV has plenty of traffic but no takers. W9BAZ is off for two weeks, as the house is being remodeled. W9GGB has pinned his reputation to a single 210. Bad conditions broke up skeds for W9DDQ. W9ELL is getting out very well with 14-mc. fone. W9EYW has built another xmt which is the last word in performance. W9AZY has a new receiver for DX. The BCL's are trying to hook their sky-wires to W9BWJ's new tower. W9AUH reports schedule with W2VO. W9AXU breaks loose with news on his remote control. W9ZZE is on the move again. W9DAI is unsuccessfully attempting to raise Cuba. W9AIN has been seen frequently with "the yl." W9AJY is a source of wonder to guests of the Kentucky Hotel. A prize will be given to the ORS handling highest total for the summer months (July, August and September), so better get your skeds oiled up now.

Traffic: W9OX 51, W9BAN 45, W9FZV 37, W9BAZ 18, W9GGB 13, W9DDQ 11, W9AUH 6, W9EYW 9, W9ELL 11, W9AZY 7, W9BWJ 6, W9AXU 3.

MICHIGAN — SCM, Dallas Wise, W8CEP — W8CEP has a fifty on 7000 and a 250 on 14,000 kcs. W8GJ thinks he will die of old age before he gets a crystal to work. W8DDO is pounding along in the same old way. W8TJ is back again, but reports poor WX for radio. Army activities hampered the gang at WYE. W8DYH has been busy sending code practice for beginners. If interested, listen on 3600 kcs. Tuesdays and Thursdays, at 7 p.m., E.S.T. W8AXE reports good DX signals on 14 mc. W8BRO wants to go to camp with the National Guard in July. Any other Hams interested get in touch with W8DMS at Detroit. W8CKZ is getting ready for summer, but not with the old transmitter. W8PP is teaching a couple of beginners the code. The baseball season is QRMing the traffic down at W8DED's. W9GJX came down to Ypsi for the Hamfest. W9CE reports poor conditions on both 7 and 14 mc. W8AJC is busy with the Army Net. W9EQV is studying for a commercial ticket. W9EGF says all the schedules have gone "Hay Wire." W8ZF hopes to get into the traffic column next month. W8JD has hooked up with the National Guard. W8DFS has been troubled by the heavy QRN. W8CEG is a newcomer from Detroit. W8CU can't get the insects out of his MOPA. W8ACB is playing around with a screen-grid detector circuit. W8BRS reports things dull. The Michigan Hamfest at Ypsilanti National Guard Armory was the best attended of any held to date, there being about 118 Hams present. W9GJX and W8BRS were two of the notables present. W8DMS, W8CAT, W8VT, W8COW and W8DYH put the job over, and we'll say "Well done." Having served as your SCM for the past three years, I feel that I can no longer attend to the duties. This will be my last report. I wish to thank you, gang, for your splendid co-operation. Until after the regular SCM election to be held later, please send reports to Kenneth Conroy, W8DYH, 7553 Robinson, E. Detroit, Mich. Cul, gang, and hope to QSO from W8CEP. 73.

Traffic: W8ACB 11, W8CEG 3, W8JD 129, W8ASO 6, W9EGF 13, W9EQV 2, W8AJC 61, W9CE 5, W9GJX 5, W8DED 3, W8PP 32, W8CKZ 4, W8BRO 26, W9AXU 16, W8DYH 36, WYE 68, W8TJ 12, W8DDO 19, W8CPB 12, W8CEP 8, W8COW 19.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9DTK has his new AC receiver completed. W9FSS has no Army Net to worry about during the summer. W9FAW has a new DeForest 510. W9VD now has a new screen grid DC receiver, frequency meter, and Hi C transmitter all in good working order.

Traffic: W9DTK 66, W9FSS 3, W9FAW 1, W9VD 4.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — I sure do appreciate being made SCM, fellows, and will try to fill the office in the most efficient manner. W9IK, W9CUU, W9EEK, W9FLF, W9FMC, and W9DYA enlisted in the Naval Reserve. W9FCA says he is going to Coyne next fall. W9DM handled some traffic W9DGS is QRL work. W9DFG states that the radio wx is very poor. W9BVF handled a rush message via N9NINIC and WU from a U. S. Marine Aviator, who cracked up in Nicaragua. W9DYA may not get in the Naval Reserve because of his eyes.

Traffic: W9BVF 48, W9DGS 16, W9DM 5.

SOUTH DAKOTA — SCM, D. M. Pasek, W9DGR — The Sioux Falls gang report a fine picnic at Iowa State Park, the Luverne, Minn., gang being there en masse. W9DNS is very busy at KSOO. x9BQV stopped at W9CIR for a nice visit. W9DB is working on a 3.5 mc. xtal outfit. W9CKT has a portable (W9DUS) outfit. The following A-A stations are active on schedule: W9DB, W9DNS, W9CIR, and W9DGR.

Traffic: W9DNS 92, W9DB 11, W9DGR 2.

NORTHERN MINNESOTA — SCM, C. L. Jabs, W9BVH — W9AV is planning on a mercury arc. W9DOQ reports W9CYZ, a new station at Virginia. W9EHO has a rotary converter but is too busy with farm work to use it. W9EGU had a fine trip to Hartford to attend the A.R.R.L.

Board of Directors meeting. W9GGQ asks to have his O.R.S. put on the inactive list for the summer months. W9FAQ sends in a fine letter reporting on activity at his station. W9BVH expects to be on again after making a few minor changes.

Traffic: W9AV 27, W9DOQ 4, W9BVH 7.

SOUTHERN MINNESOTA — SCM, J. C. Pehoushek, W9EFK — W9COS could only handle 668 mags. this month. Hi! Leach at W9BN has been rebuilding. W9DRG rates a WAC certificate. W9BKX is going into his usual summer experimentation and improvement period. W9AIR attended two banquets. W9BXE was on the rifle range most of last month. W9ABK is on at W9BXE some. W9AQH has moved to Lake Minnetonka, where he has a beautiful 860 crystal-controlled set in his shack. Ex-W9IL is now W9IL at Los Angeles. W9GHO is putting in crystal control. W9BHZ is planning on lots of fishing. W9DGE is operating on the river. W9EFK is on spasmodically. W9EYL expects to be on regularly through the summer. W9BSH is QRL at W9RHM. W9FLE was sorry not to make the Ames convention. W9GGA, W9DHP, W9CIX, W9DGW and W9DOP are all on the inactive list. W9EOH is with KSTP. W9BQF has three transmitters on three bands. W9YC staff has been rebuilding WLB. Cotton, W9DPX, will be the R. I. at Portland, Oregon, after graduation. W9DRC has been quite sick but is improving rapidly. W9FFE has been assigned to ex-W9DZA. W9BIY is at KSTP.

Traffic: W9COS 668, W9BN 323, W9DRG 166, W9BHZ 42, W9BXE 12, W9GHO 7, W9AIR 7, W9BHZ 4, W9DGE 1, W9EFK 1.

DELTA DIVISION

TENNESSEE — SCM, James B. Witt, W4SP — It looks like summer weather has started taking its toll. W4FR will be off the air most of the summer as he is going to the country. W4LU will handle some of his traffic. W4VK will also be away most all summer. W4AHB, who was formerly at W9ALY and W9AGD, has applied for an ORS certificate. Philip Stout of old 5XK will be on soon with call letters W4AAD at Kingsport. W4AFS has skeds with nine different stations. Whether you are an ORS or not, send your reports in, fellows.

Traffic: W4AFS 63, W4FR 32, W4VK 23, W4AJQ 8, W4KH 4, W4CW 2, W4SP 4.

MISSISSIPPI — SCM, J. W. Gullett, W5AKP — The following stations are members of the Army-Amateur Radio System: W5AKP, W5FQ, W5AAZ, W5BBX, W5BHL, W5AZV, W5BQL, W5BHI, W5GG, W5AWP, W5BEV, W5ZZO, W5AUB, and W5BHC. W5AAP says traffic has fallen off greatly. W5AWP and W5BHI have new transmitters going in the 700-ke. band. W5AHR is a new station in Corinth. W5BHL has made application for ORS appointment. W5AZV reports that Jackson Amateur Radio Association has been formed with himself as president; W5BHL vice-president and W5BNW treasurer. W5BOT is a new station in Jackson. W5AED is back with us after several months' illness. W5GQ is talking of rebuilding his transmitter. W5BMA has moved from Ellaville to Laurel. W5AKP has two new Western Electric 211E tubes and is debating as to just what he wants to do with them.

Traffic: W5AKP 88, W5AED 83, W5AAP 20, W5AWP 18, W5AZV 13.

LOUISIANA — SCM, Frank Watts, Jr., W5WF — The first item on the clip this month is to mention the LOUISIANA Convention, to be held in Shreveport sometime during the latter part of the summer. We also will welcome any op from out of the state. W5BHV reports that the OW has taken up ham radio and will apply for license. W5EB, who is the Director from Delta Division, visited WSCMP on his return trip to Hartford. W5YW says they are always looking for traffic. W5ANA is now working on a xtal rig. W5ZW is the call assigned for the use of the Pelican Wireless Club of Monroe. W5BDJ is on the inactive list. W5ACY is now in the Army-Amateur Net. W5NO is operated by a group of operators of a seismograph party. W5MH reports that 7 mc. is the only band he can work. W5WF was disrupted for a few days on account of storm blowing antennae down.

Traffic: W5ANA 50, W5WF 49, W5YW 28, W5EB 23, W5BHV 19, W5ACY 1, W5PG 12, W5BKL 13.

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HUDSON DIVISION

EASTERN NEW YORK — SCM, H. J. Rosenthal, W2QU — W2ALI is moving to Newburgh. W2AVS is back on the air after a six months' vacation. W2BAI is working on 28 mc. W2BKN says DX is good on 7 me. W2ACB entertained several of the A.R.R.L. Directors and showed them through the G.E. Laboratories. W2UO had bad luck with traffic this month. W2ANV says that 7 me. is entirely dead during the day. W2BRS is also known as W1ARL when at his home in Danbury, Conn. W2SZ is off the air while experiments are being conducted. W2RD was the only Bronxville ham reporting. W2ACY is marking time on 7 me. before going back to 35 me. W2LU reports the Schenectady Amateur Radio Assn. now has 84 members. W2BJA is going to put in pure DC. W2BWV again reports that he is moving to the Eighth District. W2QU has arranged with the Pilot Good Will South American Flight to handle its traffic via station NN1NIC.

Traffic: W2QU 404, W2LU 135, W2ANV 96, W2BAI 53, W2BWV 38, W2RD 29, W2AVS 15, W2ALI 11, W2BRS 6, W2ACY 5, W2ACB 3, W2BJA 3, W2BKN 2.

NEW YORK CITY AND LONG ISLAND — Acting SCM, V. T. Kenney, W2BGO — Manhattan — A non-ORS, W2AJP, comes through with a total that beats all ORS in his boro except W2AFO, and while using 201A tubes is getting reports from ZL and VK on his signals. W2AFO leads his boro besides doing lots of OO work. W2BXW, a new ORS, wants skeds with Florida and Vermont. W2BDJ had an early vacation. W2BNL says he met old 2DN on the air; after being off the air for seven years DN comes back on 3.5 mc. W2AOY says the only QSO lately was by flashlight and key with gob on one of the battleships laying in the harbor. W2BZN requests QSOs with the local gang. Bronx — W2AII leads the Bronx. W2CYX is visiting at various conventions around the country. W2AET keeps them going. W2AQG is having his troubles with BCLs cutting down the sky wire. W2VG has QRT most skeds until the cooler weather. W2AVP can now be heard on the 14 mc. fone band with a fine signal. Brooklyn — W2ATZ is getting D3 reports without any filter in the transmitter. W2ARQ's new YL is causing plenty of QRM for him. W2APK sends in a good total. W2PF, Army Radio Aide, helped man the Hudson Division convention. W2CCD is just about ready to hit the sea again for the summer. W2BIV, OO, has a 14 mc. fone going. W2BEV, a new ORS, promises to make the BPL next month. W2BFJ sends his first report. W2AQQ tells us he'll be on 14,000 kc. for the summer. W2BRB is working on direction finders and aircraft radio. Long Island — W2AVP, the old reliable, has a new ham operating at his shack; he is W2CGA. W2AYM, the Boy Scout station, goes on the inactive list.

Traffic: Manhattan — W2AJP 48, W2AFO 44, W2BXW 17, W2BDJ 8, W2BNL 2, Bronx — W2AII 77, W2BGO 47, W2CYX 45, W2AET 19, W2AQG 12, W2VG 2, Brooklyn — W2ATZ 84, W2ARQ 58, W2APK 52, W2PF 28, W2CCD 27, W2BIV 17, W2BEV 8, W2BFJ 5, W2AQQ 3. Long Island — W2AVP 52, W2AYM 1.

NORTHERN NEW JERSEY — SCM, A. G. Wester, Jr., W2WR — W2CXL turns in the usual excellent total. W2JF complains of bad wx and cancellation of skeds. W2DX has a YL who keeps him off the air. W2AOS says that QRN has dropped his traffic figures. W2WR has been to Atlantic City on business. W2APU and W2QVQ complains about the 7 me. band. W2CWX has too much business pressure to pound brass. W2AGX is rebuilding and installing an 852. W2AVO has been busy in a BC station. W2BPY intends to install xtal. W2PC has installed a xtal and is on 7000 kc. with a pair of fifty watters in push pull in the final amplifier. W2CJX is another who complains about poor conditions. W2BTT and WBMF paid a visit to our YL station, W2BY. W2BZB is out for DX on the 14-mc. band.

Traffic: W2JF 86, W2ACB 21, W2APU 2, W2CWX 4, W2JC 14, W2AGX 3, W2AVO 22, W2BPY 12, W2PC 15, W2CJX 16, W2BZB 3, W2CXL 338.

MIDWEST DIVISION

NEBRASKA — SCM, C. B. Diehl, W9BYG — W9ANZ has been very ill. Mrs. W9ANZ reports for him this month. W9QY and W9BOQ are busy with farm work. W9EEW runs away to Chgo this month.

W9DTH can't scrape up much this time. W9DVR reports. W9EBF says QRN heavy. W9FAM is rebuilding for higher efficiency. W9EHW is "Cat-Hauling" power supply for DC tone. W9BHN, a new ORS on 7100 kcs., has nice total. W9DI is rebuilding for 14 mc. 9GFQ, a new CC station, is on the air at Lincoln. W9BQR is building a Zep Ant.

Traffic: W9QY 12, W9DTH 3, W9EBF 1, W9BHN 10, W9DI 2.

IOWA — SCM, H. W. Kerr, W9DZW — Davenport leads the gang this month with W9ACL in the lead, followed closely by W9FUD. W9BCA has a KFR6 sked. W9FZO notes the TSARC plan a new club house and permanent station. W9DXP notes prospects for club at Des Moines: W9BSZ is active. W9APM is rebuilding. W9HD is xtal-controlled. W9FFD has been 14,000 kc. since convention. W9DUN, another newspaper and golf bug, reports a few. W9GKL reports for Ames. W9FWG has visions of a new xmtr. W9EOP finishes college. W9EJQ has his Amateur Extra First. W9BTL will be on again with brother Glen at the key. W9AIR and gang called on W9DIU, W9EJQ and W9DGW on trip to convention, also on W9EXQ and W9DXO. The Ames convention was a WOW, and no one went to sleep on a solid day of technical stuff. Our thanks to all who helped make such a fine meeting.

Traffic: W9ACL 68, W9FUD 47, W9BCA 44, W9DZW 41, W9FZO 22, W9DXP 18, W9FFD 9, W9DUN 7, W9GKL 2, W9FWG 2, W9EOP 2, W9EJQ 2.

KANSAS — SCM, J. H. Amis, W9CET — The usual summer slump is with us. Your SCM doesn't like to cancel ORS appointments, but it will be in order if you don't report each month. W9DFY takes traffic honors. We are glad to see W9FKD putting out large traffic totals again. W9CET is all set for the 28-mc. tests. W9FLG has been winding some new power transformers. W9GFO is leaving the section to enter radio school in New Orleans. We're sorry to lose you, OB. W9CFN finds it impossible to keep skeds on account of bad wk. W9BTG gets R-5 from WFBT in N. Z. with 20 watts imput on 14 mc. W9HL reports little activity in western Kansas. W9ESL lost his two lattice masts in the big tornado. Say, gang, let's all get on 14 mc. for the summer and keep our traffic up. The Topeka W.S.N.R. unit drills each Wednesday nite at their Armory on the State Fair grounds. The dates for the Midwest Division Convention will be September 5th-6th at Topeka. The K.V.R.C is busy making plans. At the first meeting in May the K.V.R.C elected the following officers for the coming year: W9CET, President, W9FLG, Vice-President, W9DEB, Secretary and Treasurer.

Traffic: W9DFY 80, W9FKD 55, W9CET 52, W9FLG 28, W9GFO 24, W9CFN 14, W9BTG 10, W9HL 5.

MISSOURI — SCM, L. B. Laizure, W9RR — St. Louis reports W9DXY led in traffic. W9FTA was second. W9AMR was off doing considerable rebuilding. W9DJY is down on 14 mc. W9ECI sends in a first report. He has applied for ORS and OBS appointment. W9DQN led Missouri this month with the assistance of W9ECS and W9ALC, who have been operating much of the time. W9CFL handled considerable U.S.N.R. traffic. W9DPA sends in a "Calls heard" DX list. W9GGI is still getting started. W9AKZ rebuilt the works. W9BMA is running 6 skeds. W9ASU was in Kansas City for an operation, but is back home now. W9FUN has been trying out Electrlytic filter condensers. W9AOU and W9API are two new stations in Webster Groves. W9EDK had considerable trouble lately, moving and changing jobs. W9EYQ is now on in Monett. W9GAR reports a new ham organization started in his section known as the South Missouri Association of Radio Amateurs which W9CLU and W9GAR are taking the lead in promoting. W9EP is still open for east and west skeds. W9BJA has been having trouble with filter condensers. W9CDU says he will be on 7 and 14 mc. until fall. W9ENF was on more this month. W9DHN had school QRM most of the month. W9DNO was only on two days when home week-ends. W9BGN represented the St. Joseph gang this month. W9DCD sent in a long report. W9GAW was killed in a motorcycle accident. W9AWE is busy running a summer resort camp.

Traffic: W9DXY 104, W9FTA 50, W9AMR 6, W9DJY 5, W9ECI 11, W9DPA 3, W9AKZ 62, W9BMA 90, W9CFL 75, W9DQN 307, W9EPX 3, W9BJA 17, W9CDU 30, W9ENF 10, W9DHN 12, W9DNO 8, W9BGN 52, W9GAR 52.

NEW ENGLAND DIVISION

EASTERN MASSACHUSETTS — SCM, Miles Weeks, W1WV — W1CMZ, W1WV and W1BR head the list this month and make BPL. W1CMZ has a new monitor and is contemplating crystal. W1ASI has entirely rebuilt everything. W1RV is now op on S.S. *Santa Rita*, New York, to Valparaiso, Chile, and has resigned his ORS. W1QZ blew his 210. W1BBT reports a fine time on the U.S.N.R. cruise. W1WU is winding a new 1 KW. transformer. W1LQ is building separate outfit for 3500 and 14,000 kc. W1BLD expects to be on regularly now that school is over. W1BXB was very QRL at WPC this month. W1AAT has been sick. W1BZQ still reports difficulty in getting skeds on 7000 kc. after midnight. W1WV has been keeping occasional skeds with W10-XS, one of the Boston to New York Transport planes. A new MOPA is now perking at W1ACH. The ORS appointment of W1RL has been cancelled for inactivity. W1AZE handled some foreign traffic. W1CHR and W1CQN again report some traffic. The Eastern Massachusetts Amateur Radio Association and this section were well represented at the Worcester Convention. The Association is planning a club house of its own and looks forward to a larger membership than ever next fall.

Traffic: W1CMZ 311, W1WV 163, W1BKR 103, W1ACH 102, W1AZE 79, W1BZQ 54, W1BXB 46, W1WU 4, W1CQN 4, W1ANK 2.

MAINE — SCM, G. C. Brown, W1AQL — Manley Haskell, chairman of the Committee on Arrangements, says that the convention at Portland will be better, bigger and merrier than ever. Don't forget the dates: August 22d and 23d. W1ALZ has been confined to the house for some time with a severe attack of pleurisy. W1AQD reports handling traffic from New Zealand and Chile. W1AUR is second high in traffic. W1AHY says that traffic is picking up over his way. W1BFZ has been struggling through a bad power leak. W1CDX's new QRA is: 174 Eastern Prom., Portland, Maine. W1QH has been testing on 28 mc. The Queen City Club recently enjoyed its first outing of the season at W1BFZ's camp at Hermon Pond. W1ARV says that Jack Pierce, formerly of W1EB, is the proud father of an eight-pound daughter. Congratulations, OM.

Traffic: W1AQD 89, W1AUR 24, W1CDX 12, W1AHY 6, W1BFZ 3, W1QK 3, W1AQL 2.

RHODE ISLAND — SCM, C. N. Kraus, W1BCR — W1BML, W1GU and W1CPH are new prospects for ORS. W1AMV is back from a trip down south, where he has been operating on airplanes for the Pan-American Airways. W1AWE is hot on the trail of a good note. W1BCR's transmitter is undergoing changes. W1MO is active on 7 mc. W1CPH recently received his commercial ticket. W1GV reports Cranston activities direct to HQS. He, W1OU, W1AFO and W1AJP are using 'phone. ExW1ABP expects to be back on 'phone shortly. W1GV is a newcomer to our ranks. The Radio Club of R. I. received the fone signals from KHIJQ, the airplane (*New Arabella*), while they were flying over New England. Club meetings are held every Monday evening. A cordial invitation is extended to all amateurs to attend. Address is 67 Pearl Ave., East Providence.

Traffic: W1BCR 11, W1MO 14, W1GV 6, W1OU 1.

CONNECTICUT — SCM, Fred A. Ells, Jr., W1CTI — W1ATW has rebuilt his receiver. W1HQ says very little doing in Milford. W1AMQ received his ORS appointment. W1AGZ has been appointed official observer. W1MR says summer is breaking up a lot of skeds. W1CKP reports things quiet there. W1AFB still keeps a sure-fire sked with W1JN. W1BQH has school QRM. W1ATG tells of W1APN, old 1WZ, now in Bridgeport with a 210. W1AKI sends in his initial report and asks for an ORS. W1BOD was on the delivery end of a fast message from Chile. W1AJB reports. W1ABL is pushing out a lot of traffic on 7100 kc. W1JN is signing off for exams and vacation. W1AOX reports working KHIJQ, the plane, *New Arabella*, on its flight from Hartford to Pawtucket. W1BJK gets on 3.5 mc. once a week for Army traffic. W1UE will soon be on at new QRA in Elmwood. W1TD has been working hard fixing up new rooms for the club. W1AZG is experimenting with different types of antennae. W1CTI sticks to the 3500-ke. band. W1AMG got his report in just in time to make the write-up. W1RP is buying a new bug.

Traffic: W1MK 493, W1AMQ 46, W1HQ 3, W1ATW 32, W1AFB 79, W1AKI 2, W1BOD 17, W1AJB 3, W1ABL 76, W1JN 55.

VERMONT — SCM, Clayton Paulette, W1IT — W1CGX is again high man with a total of 73. W1BD comes next with 29. W1AOO reports. Most of the stations in the state have cancelled their skeds for the summer.

Traffic: W1CGX 73, W1BD 29, W1AOO 10, W1IT 6.

WESTERN MASSACHUSETTS — SCM, Dr. J. A. Tessmer, W1UM — W1NS had a race with W1BZL for first one working all districts on 3.5 mc. W1NS won with his 210. W1CTF is bothered with much QRM from local YL's. W1COS is attending Sam Curtis' Radio School in Boston. W1ARP has a baby YL. W1AMF has the most beautiful transmitter. W1ARP has been in N. E. or N. J. W1BLV and W1CR visited W1MS. W1BKQ had a hum-dinger Spring Ham Fest and Pitch Party. W1AJK is in Brooklyn and comes to Worcester week-ends. W1AQM is on 3500 and 14,000 kc. wid a 7 1/2-watter. W1BVR is still on the 3500-ke. band. W1BNL is building a new traffic tuner. W1APL will be on regularly soon. W1BG is experimenting with 'phone.

Traffic: W1BVR 29, W1AQM 10, W1APL 3, W1ZA 69.

NEW HAMPSHIRE — SCM, V. W. Hodge, W1ATJ — W1APK sends in an interesting report of two-way airplane work with KHIJQ, the plane *New Arabella*. W1AEF doesn't have time to pound the old key much. W1COW will be on at W7ANZ on 14 mc. in a month. W1AUY reports things very quiet in Meredith. W1IP is going to rebuild the whole works. W1BAC, a new station in Claremont, is reaching out with a 211-A. W1UN is building some portable sets for use in the White Mountains. The SCM reports a new Jr. Op., born May 2d.

Traffic: W1APK 17, W1COW 9.

NORTHWESTERN DIVISION

MONTANA — SCM, O. W. Viers, W7AAT-7QT — W7AAW and W7HP are the only reporting stations this month. The fellows who have been sleeping for the past two or three months had better come to life, or there will be some ORS tickets cancelled!! W7AAT is still on 7040, 7020 and 3790 kc.

Traffic: W7AAT 91, W7AAW 89, W7HP 2.

OREGON — SCM, Wilbur S. Claypool, W7UN — Coos Bay scores again. W7AMF makes BPL on deliveries. W7UD hands in his first total. W7PE is using Electrolytic Condensers in his filter. W7ALM is going great on K7 traffic now. W7MY reports traffic. W7TO is heading for Alaska this summer. W7WR asks to be placed on inactive list for the summer. W7MV had such a hot report he wrote it in red ink. He is using fone on 3500 kcs., as does W7WH. W7IF reports via radio. W7AHJ and W7AJX report in fine shape. The OW always leads TOM in TFC. W7AIG reports rotten radio WX in his town. W7QR hopes to hang up a WAC with the new Hi-pwr. he uses. W7AMQ has an 852 perking now. W7SU has his XTAL going. The SCM is using MOPA with good success on 3500 kc. W7ANJ is also using it. W7AJW has put in DC. W7QY is in line for ORS.

Traffic: W7AMF 162, W7PE 58, W7UD 102, W7ALM 40, W7MV 17, W7MY 23, W7WR 18, W7TO 20, W7AHJ 9, W7AJX 6, W7AMQ 24, W7IF 10, W7AIG 2, W7UN 27.

WASHINGTON — SCM, Gene Piety, W7ACS — The first place in traffic is taken by W7QF on his first report. He is vice-president of the Spokane Radio Ops Club and says that the plans for the convention are coming along fine. Mason is back from the Byrd expedition, and the gang gave him a coming home party, in the Bergonian Hotel in Seattle. Thirty-four amateurs attended, and a good hamfest was held. W7ACY has been working a little dx. W7FJ complains about school exams. W7AG is trying out 3.5-mc. fone. W7AFD blames low traffic on poor conditions. W7TX is not having much luck with his Alaskan skeds. W7ANP reports tonsilitis. W7BB reports from Canal Zone. W7AJS reports between school tests. K7AIF (W7AF) sends in reports and asks gang to look for him. Don't forget the convention on August 29th and 30th.

Traffic: W7QF 33, W7TX 18, W7AG 10, W7ACY 6, W7TK 4, W7AJS 3, W7NR 3, W7AFD 1, W7FJ 1, K7AIF 8.

PACIFIC DIVISION

SANTA CLARA VALLEY — SCM, F. J. Quement, W6NX — With 723 messages to his credit — 598 delivered — all transpacific, Colonel Foster, W6HM, finished a most successful season of message handling. For the next several months W6HM will be silent while the Colonel vacations in British Columbia. W6YG continued to handle many msgs on sked. W6ALW is putting in xtal control on 7200 kc. W6DQH has moved out in the country where QRM is negligible. W6BMW has been experimenting with portable radiophone. W6BAX reports lots of DX on 28 and 14 mc. W6EEC is using 14 mc. with good results. W6AME answered the lure of the trout streams this month. W6CTE is op on the U. S. S. *Admiral Peoples*. W6AZS is another 14 mc. man. W6CHC, W6AYT and W6BBG are new Modesto hams. W6BBG is a YL and second op at W6DQH. W6DCI received portable call W6AHT. W6BRV was QSO SA and Asia on 14 and 7 mc. W6FV will soon be on the air. W6CLP and W6KU are on 7 mc. W6EJU and W6BZG are active fone stations. W6QA is on 7 and 3.5 mc. with xtal control.

Traffic: W6HM 723, W6YG 99, W6ALW 72, W6DQH 61, W6BMW 30, W6EEC 3, W6AME 2, W6NX 10.

EAST BAY — SCM, J. Walter Frates, W6CZR — With the northwest trades pushing white fleecy clouds across the perfect indigo of a May sky, the meadow larks trilling in the green foothills, and that faint sparkle about the YL's eyes, our traffic handlers have climbed into their tin chariots and have scampered away after that elusive CQ of the spring. All of which means that the fellows are not reporting as well as they might. W6AWF has just gotten his commercial ticket. W6EIB at Vallejo ran him a close second through his work installing a booth during the powwow of the Red Men in his home city. The station was built up with the help of W6ABJ. The outfit was operated under W6EIB's portable call. W6EIB expects to be off the air for a month or so while he changes himself and family into a new hogan. W6ALX declares that 7025 kc. signals are the bunk these days. W6BPC reports receiving a letter from a ZL in which the Zeider says that he has heard all U. S. districts on 3500 kc. and about 20 U. S. A. fones on this band. W6BZU out at Concord isn't letting the call of spring and the droning of the bumblebees bother him as far as traffic is concerned. W6ARI, new station reporting, was rounded up by our rotund CRM, W6AQ. W6ASH reports that he is working in a bona fide radio shop now. W6CGM is a fireman on the Western Pacific and the other day his locomotive with the OM in the cab got tuned in on the same wave with a Key System street car, ruined the street car, and gave 11 passengers spots before the eyes. He told W6AN, section secretary and an official of the street car company, at the official investigation of the crash that it wasn't personal. Anyway W6CGM says that 00 work and busting up W6AN's rolling stock keeps him too busy for traffic. W6BIW announces that he has been monkeying with 28 mc. W6RJ is busy doing 00 work. W6AIN says he is going on a vacation. W6BII reports that he is busy getting six USNR fone and CW sets on the air for code practice and drill on 1875 kcs. W6AQO is one of the new fellows brought in by W6AQ. W6ATT is still doing his old BC and ham stint. W6ALV is still busy with that YL. W6ZA has announced his engagement, and W6CQG, Vollmer, got married a few weeks ago. W6IP spent a short visit home before returning to the Orient on KDUY. W6DDA is also back from a voyage.

Traffic: W6AWF 431, W6EIB 401, W6ALX 393, W6BPC 126, W6BZU 72, W6ARI 72, W6ASH 43, W6CGM 37, W6BIW 37, W6RJ 22, W6AIN 18, W6BI 17, W6AQO 4 W6ATT 3.

LOS ANGELES — Acting SCM, C. A. Nichols, W6ASM — Well, gang, this is my last report as acting SCM, so I will take this opportunity to thank you one and all for your splendid cooperation. Mr. Sandham is back on the job again. Let's all continue to give him our best efforts. The following make the BPL this month: W6BZY-W6WA-W6DEP-W6AKW-W6QP-W6KD and W6AOA. The Short Wave Club of Pasadena has been holding some interesting meetings of late. Through the courtesy of the Automobile Club of So. Calif. and W6FE, the Long Beach gang

had the opportunity to see the outfit and car that the SCM used on his trip. The ARRC continue to have some peppy meetings. The Bakersfield gang once more take the traffic banner among the clubs, their total being 919. W6WA is responsible for the reports each month. W6MA now has a frame for her operators license. W6ZZA is rebuilding his portable into xtal control. W6BVZ has a new 210. W6EQD now has his xtal outfit on 7154.5 kc. W6AM says that 14,000 kc. is sure fb for dx now. W6BRO is not on much since the IPH expedition returned. W6ABK says work takes up his time. W6ERL has new QRA. W6CZT is changing both xmitters to MOPA. W6CXW wants a sked with a nine near Chicago. W6BCK is another unfortunate one that has to work for a living. W6TE is rebuilding his xmitter so as to make a more substantial bid for the ARRC Cup. W6DVA has been up to San Francisco. W6EAF reports a visit by W6AM. W6AWY wants the Heaviside layer to behave. W6UJ complains of bum conditions in the 7000-ke. band. W6AKD reports being heard in Africa on 28,000 kc. while using a 5-watt xmitter. W6QP wants traffic. W6AKW continues to handle Philippine traffic. W6DEP handles plenty of traffic. W6BZY leads the section in traffic. W6BFI is waiting for a 250-watt jug. W6ID is building new receiver like the one Schnell had at the convention. W6DZI reports a few blowouts. W6ACL is rebuilding receiver. W6ESA now has xtal control. W6FJ says that his 210 xmitter works better than his 50-watt outfit. W6ASM won the croquetted water bucket in the traffic contest between the "Pico Twins." W6BXR annexed an OW in April. W6BVV is going to college and dreaming of football and YLs.

Traffic: W6BZY 545, W6WA 453, W6DEP 291, W6AKW 279, W6QP 274, W6AKD 229, W6AOA 154, W6AOB 137, W6DLI 129, W6UJ 89, W6ETJ 95, W6DQV 73, W6AWY 63, W6ETN 51, W6EAF 51, W6ENH 37, W6DVA 29, W6TE 29, W6BCK 27, W6CGY 23, W6AGR 14, W6ENQ 14, W6CXW 12, W6BGF 11, W6CZT 11, W6ERL 10, W6ESA 10, W6ASM 5, W6COT 5, W6ABK 4, W6FJ 4, W6BRO 4, W6AM 3, W6EQD 3, W6CIX 2, W6BVZ 1, W6ZZA 1, W6MA 1, W6AZL 1.

SAN FRANCISCO — SCM, C. Bane, W6WB — The report this month might well be headed "Rebuilding." This new ruling about DC has set all the boys to tearing up the old heap and installing something different. W6ERK leads the parade in traffic. W6EKC comes along with a very close second. Eventually, both W6ERK and W6EKC make the BPL. W6DFR is to be complimented on the way he handles the A-A schedules each Monday night. Another new man to report this time is W6DCD, who breaks in with a very good total. Beginning June 15th — July 15th all ORS in this section will be required to have a total of at least 20 messages each reporting month. Failing to comply with this rule for two consecutive months will result in cancellation. W6FW reports as usual. OM Phalen sends in his report for the first time in quite some little while. W6AC is still haunting the 14-mc. band. W6AMP has finally succeeded in getting DC after months of lost sleep! W6DTZ is concerned about 14 mc. dx work. W6EPT is with us again. W6ATI has drawn up elaborate plans for his new xtal set. W6KJ and W6BTO are complaining about absence of signs on 28 mc. W6ETR is scouting around for a rock which he plans on putting in very shortly. Once there was a station called W6BIP, who used to lead the section. He is now on the very bottom of this report — why?

Traffic: W6ERK 170, W6EKC 111, W6DFR 88, W6DCD 53, W6PW 57, W6HJ 16, W6AC 13, W6AMP 13, W6DTZ 7, W6WB 6, W6EPT 5, W6ATI 2, W6KJ 2, W6BTO 1, W6ETR 2, W6BIP 1.

ARIZONA — SCM, H. R. Shortman, Jr., W6BWS-W6VV — W6ALU makes the BPL with a fine score. He wants a couple of good skeds east. W6BJF and W6EFC report good traffic work. W6DGN has rebuilt his station. W6DRX, a new man in Phoenix, is doing nice work. W6DCQ is still monkeying with a 3500-ke. phone. W6DXC, another new man, is getting all set for some big traffic work. W6AYO is now living in Phoenix, having an operators job at KOY. W6DRE reports installing a pair of UX 852's. W6AAM, an old time, is back on the air with a UX 210 in TPTG. W6BHC spent two days in Phoenix. W6EFC reports rotten DX and bad QRN. W6EAA is back on the

air using a UX-210 on 14 mc. W6EOF changed his transmitter from Hartley to TPTG with gratifying results. W6EH, W6EOF, and W6BWS-W6VV, the "Three Musketeers" held a big reunion when W6EH spent a week in Phoenix on business. W6CDU is operating at W6ALU. W6BWS-W6VV reports that he now has a junior operator at KGSI, in the person of W6EEB-W6ECW from Los Angeles. W6BJF has a new "all electric" receiver. The SCM has heard from W6DAU. W6ANO is still pounding commercial brass at KGSL. W6EL installed a 14 mc. phone transmitter in an aeronea monoplane to operate a public address station on the ground in a demonstration at the Phoenix Sky Harbor Airport. W6AWD reports moving. W6DWP, who was formerly 3API of the old spark days, reports that he is back with the gang.

Traffic: W6ALU 259, W6BJF 106, W6EFC 66, W6AWD 10, W6DWP 7, W6EAA 2, W6EOF 1.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6AXV leads the section and makes the BPL. He is taking out an ORS soon. FB, W6BKX, a new ORS, is rebuilding for all bands. W6ACJ found time to handle a few. W6EPZ worked LU3FA and got R8. W6ADC got his 50 watt going. W6CTP worked Hungary with 112A and 200 volts of B batts. W6EPF is troubled with power noises at his new QRA. W6BGL is on fone now. W6EOS is still rebuilding. W6BAM is going to be in on the 28 mc. tests. W6AEP reports fone slow. W6ECP expects to be going strong soon. W6EOP and W6DAI are on fone. W6HY is heard on 14, 7, and 3.5 mc. quite often. W6DNL is away with the fleet. W6QY is on 14 mc. at his new QRA. W6DNS and W6DGW is very QRL with YLs. W6EOL is on with a 210. W6DNW is still putting out ice cream between ham hours. W6CTR is on fone and is going to build a 50-watt set soon. W6AJM expects to be in on the 28 mc. tests. W6FBF has a 250 watt.

Traffic: W6AXV 238, W6BKX 96, W6ACJ 63, W6EPZ 40, W6ADC 25, W6CTP 19, W6EPF 13, W6BGL 9, W6EOP 9, W6EOS 6, W6BAM 4, W6AEP 4.

NEVADA — SCM, Keston L. Ramsey, W6EAD — The Nevada Amateur Radio Association is getting a fine start and promises to be a thriving Club. W6UO is busy with Army-Amateur work. W6EGA, a new amateur at Yerington, is on the air with an 852. W6BTJ is getting ready for the 28 mc. tests. W6ZO has given up radio for the summer in favor of aviation. W6AJP is on 7 mc. W6CRF is almost ready for some work with 3500 kc. fone. W6BRV is building a receiver. W6CHG is pretty quiet now. W6CDZ promises a report for next month. All active amateurs get in touch with your SCM. We need a R.M. and some ORS. Let's turn in some real reports for Nevada this summer. Fellows wanting schedules with Reno, Nevada, get in touch with W6EAD.

Traffic: W6UO 11.

HAWAII — SCM, L. A. Walworth, K6CJB — K6EWB has taken the ORS exam and has been appointed Route Mgr. also. He is sending out AKRL broadcasts for the Hawaiian Section at 5:30 p.m. h.a.t. on Wed., Fri., and Sun. on 14 and 7 mc. simultaneously. The SCM visited Maui the week before Easter and was entertained by K6DYC, K6DQQ and K6ERO. K6DYC, K6DQQ, K6ERO, K6CEU, K6EWB and K6CIB form the net of Official Observers to check up on Amateur operation. K6AXX, James Matsueda, of Kahului, Maui, walked in on the SCM and announced he has moved to Honolulu. K6AXX is rejoicing over a commercial ticket. K6ACR, K6ALM and K6CIB visited several Schofield stations on Easter Sunday. K6BOE reports his portable call is K6DQF. K6CEU is also using a portable, K6EGD. K6CIB just rec'd some fine photos of W9GV's ether wrecker. K6DYC is completely rebuilding his set and erecting a 75-foot mast for joint use of himself and K6YAJ. K6EWB and K6BXW report little activity on 56 and 28 mc. K6ALM reports on 28 mc. QSO with W6BXV. K6ALM is building an AC short wave receiver. K6EVW is heart broken because he lacked two deliveries of making BPL. K6DXD has just started and belongs to a new ham, Ralph Wolfe of Hq. Co. 35th Inf., Schofield Bks. T. H. K6DUD, Tex Stafford, Officers Quarters, Marine Barracks, Pearl Harbor, T. H., is another new station. China and the Philippines are routing through K6BXW and K6EWB now. K6BXW, K6EWB and

K6DXD have totals large enough to make the BPL, but they cannot be listed therein as we haven't complete figures on number of messages originated, delivered and relayed. Let us have the dope next time, OMs.

Traffic: K6BXW 871, K6EWB 848, K6DXD 202, K6DQQ 116, K6EVW 99, K6AVL 66, K6DV 50, K6CIB 29, K6BOE 20, K6BJJ 12, K6ERH 11, K6ACR 10, K6ACW 8, K6ERO 9, K6DYC 6, K6ALM 5, K6DPG 0, K6DUD 27.

PHILIPPINES — SCM, S. M. Mathes, KA1CY — This report received by radio via W6HM. It is impossible in this report to express in mere words how the PI gang has missed KA1CY. It seems that everybody is blue. At the suggestion of KA1HC the PI gang has moved to the upper part of the 7-mc. band in order to give the W's the lower part and thus avoid interference with traffic. KA1ZA is going to discard his 500-cycle note and put pure DC on the air soon. KA1HR is again climbing to the top. KA1EL went to Baguio with a portable set but nobody has heard of him since. KA8AA is keeping regular schedule with KA1XA. KA1XA is building an MOPA. KA1PW was the last station to work KA1CY in the Philippines and also the first one to greet him at W6HM on his arrival in the U. S. KA1AC is on vacation in Japan. KA1DL has a schedule with W6HM twice a week. KA1DJ still leads the way in traffic, which is the outcome of many well kept skeds on 7143 and 14,290 kc.

Traffic: KA1DJ 867, KA1JR 80, KA1PW 217, KA1HR 860.

CHINA — This report sent in by radio via KA1JR and W6HM. AC8WB makes the BPL. AC9HB put in new 210 with 400 volts on plate.

Traffic: AC8WB 220, AC8RV 220, AC8AG 35, AC8TJ 26, AC9GH 28.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Hal S. Justice, W4TS — W4JR is all set for some good A-A net work. W4AHH handled an important message through WFAT. Prof. W4DW operates consistently at State College. W4TS is on when time permits. W4ZB was sick part of the month. It is with regret that I find it necessary to resign as SCM. I thoroughly appreciate the way you fellows have stuck by me. An acting SCM will be appointed to handle the affairs of the Section until a permanent SCM is elected. Very 73.

Traffic: W4ZB 53, W4TS 15, W4DW 13, W4AHH 10, W4JR 6.

VIRGINIA — SCM, J. F. Wohlford, W3CA — W3BZ attended the Directors meeting in Hartford. W3ARU is still the high traffic man of the State. W3CA is building rig for CW and fone with xtal control. W3BDZ is still tinkering with his phone outfit. W3WO is on inactive list. W3CKL has finished VPI and will leave shortly for NYC. W3ZA is getting out fine with his fone since adding xtal and buffer stage. W3BGS threatens to bust some fones now that he has power at his place. W3HY will be at NKF part of summer. W3AAJ is active again. W3ALS visited W3CKL during Easter. W3AQK qualifies for an ORS. W3NO is President of Richmond Amateur Club. W3AMB is operating a portable from the Scout Camp. W3ABC is now an ORS. W3ASA is operating a beautiful new 50-watt outfit. W3AKV has a crystal controlled 50 watt. W3TJ and W3FE are heard on occasionally. Miss W3IB couldn't make the banquet because she had to buy a present for the boy friend. W3AEL and W3AEW are new hams in Richmond. The Richmond Short Wave Club is taking a State-wide census of ham activities in preparation for a Virginia Convention in October.

Traffic: W3ARU 93, W3HY 17, W3ALS 16, W3AAJ 1, W3AMB 2, W3ABC 3, W3AQK 6, W3FJ 10, W3ASA 2.

ROCKY MOUNTAIN DIVISION

UTAH-WYOMING — Acting SCM Lewis D. Stearns, W6BTX — W6RV and W6CNX are on 14,000 kc. for the summer. W6EKF has a commercial ticket. W6DPJ leads the section in traffic. W7AAH is Net Control of Wyoming. W6BTX, present Acting SCM, regrets that he cannot continue in this capacity, due to his going to University of California for the summer for graduate work. Hereafter, all reports in this section should be mailed to

Cutter R. Miller — W6DPJ — 124 East 2nd North St., Provo, Utah. W6DPJ will act as SCM until election.

Traffic: W6RV 11, W6BTX 2, W6DPJ 48, W6CNX 14, W6EKF 12, W7AAH 29.

COLORADO — SCM, C. R. Stedman, W9CAA — W9CLJ walks off with the high score. W9EAM says he will be off for a while on account of the fishing season. W9YL, a new station operated by an old-timer, Mr. Cassell, is located at the University at Boulder. W9CRS has a new wave meter. W9EFP, a 'phone man at Haxtun, sends his first report. W9CAA moved to a new location. W9AAB is still on 7000 kc. W9CAB is getting the power supply straightened out. W9RQO is threatening to get on again, if he can get the necessary cash.

Traffic: W9CLJ 14, W9EAM 4, W9CSR 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Robert Troy, Jr., W4AHP — W4LM leads the state in traffic. W4TI sets a fine example in reporting by special delivery. W4AHP has installed 566 rectifiers. W4AAQ wants A-A traffic to pick up. W4AHR is busy with school work. W4IQ has joined the A-A net. W4HJ has moved to Birmingham. We are very sorry to lose W4ADN, who has gone to Atlanta. W4HI at Maxwell Field has a fine fone outfit on 1750 kc. W4AEZ is having hard luck with his fone set. W4AKB is busy with his job. W4AJR is having receiver trouble. W4AKM will be back in the A-A net soon. The SCM would like some reports from south Alabama, and a few more from Birmingham.

Traffic: W4LM 147, W4AKM 17, W4TI 23, W4AHR 13, W4AAQ 13, W4AHP 11, W4JQ 10.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES — SCM, M. S. Alexander, W4RZ — W4JL was in an accident a short while ago and lost the little finger of his left hand, so guess he will be off the air for some time. W4SS and W4DV have their transmitters going on the 28-mc. band. W4AQF has been very active in the Army-Amateur net. W4PM has handled 397 messages during the last three months. Say, fellows, let's not let the summer vacations affect us so much that our traffic total will fall far below the standard. Let's try to keep the activities going during the summer.

Traffic: W4JD 48, W4AY 34, W4AFQ 24, W4SI 32, W4KV 38.

PORTO RICO-VIRGIN ISLANDS — SCM, E. W. Mayer, K4KD — We led the division in traffic for April, which speaks well for our small section. K4AKV reports 14 mc. giving poor results. K4KD has rebuilt to MOPA with a much improved signal. K4DK is going to try 28 mc. Some interest is being shown in San Juan vicinity, and I hope to visit the gang on my vacation and help those on the air who express their wishes. Delinquent ORS this month are K4AN and K4ACF.

Traffic: K4KD 262, K4DK 144, K4AKV 1.

FLORIDA — SCM, Harvey Chafin, W4AII-W4PAWI — W4QL leads the section and makes the BPL. FB. W4SK reports a new amateur at Melbourne Beach, W4PU. W4SK is testing with a 3500-ke. fone. W4AKH reports for W4UJ. Both of these stations are applying for an ORS appointment. W4ALH is keeping two skeds daily. W4AFT sends in a very fine total for a non-ORS. W4JO is section control station of unit 5 for the U.S.N.R. W4QV is on the 3500-ke. band now with a 100-watt fone set. W4GD is building a high-power all-band transmitter with the MOPA ckt. W4AGN, the Naval Reserve station, has moved. After W4MM read the new requirements of the Federal Radio Commission he installed two recto-bulbs, and worked his first DX station, OA. He also reports for a new amateur in Clear Water, W4RK, who is getting out of the state with a 112 high-power transmitting tube, Hi. W4AKA and W4JM are the only stations reporting from St. Pete. W4TG is burning up the ether with a 100-watt set. W4WW is going to Detroit, and will be there until the U. of F. opens next September. W4MS was in Gainesville operating W4QA until June 1st, but is back in Pensacola at a new QRA. W2XE's

QST of the Australian-New Zealand test broadcast was handled as the most important traffic at W4ADP this month. W4ABF has moved from the U. of F. City to Orlando, and his QRA is Box 836. W4OZ takes part in the U.S.N.R. drill on Thursday nites, and is also keeping a schedule with the U.S.N.R. station, W4QC, at Key West. W4JM has quit all of his DX for a while until he finishes his MOPA set. W4AGY promises to have a larger total next month. W4FV says that he only lacks one European QSO to qualify for a WAC certificate. W4ACM, the U.S.N.R. station, handled quite a bit of tfe. this month. Mr. Jim Joyner has just received his commission for the Tampa U.S.N.R., and W4AII will be the Chief Operator very shortly. W4AKJ, W4BN and the SCM are using 3500-ke. fone sets. Don Hawley and George Wells at Plant City have a station ready to go, and are applying for a license.

Traffic: W4QL 142, W4SK 108, W4AKH 63, W4ALH 61, W4AII 59, W4AFT 52, W4JO 34, W4GD 45, W4QV 27, W4MM 19, W4ACM 46, W4AKA 20, W4TG 19, W4WW 10, W4MS 9, W4ADP 8, W4ABF 7, W4OZ 7, W4JM 5, W4AGY 7.

WEST GULF DIVISION

OKLAHOMA — SCM, Wm. J. Gentry, W5GF-W5VQ is high man and not an ORS either. W5AUV wants to know what has happened to traffic. W5AYF reports a hot hook-up with W5ASQ. W5OJ made his first report. W5GF is operating at all times he can get away from business. The SCM would like to have more reports from the gang.

Traffic: W5VQ 111, W5AUV 14, W5OJ 7, W5GF 3, W5AYF 2.

NEW MEXICO — SCM, Leavenworth Wheeler, Jr., W5AHI — W5AOD has a new AC screen-grid receiver. W5TV, with a prospect, spent part of one Sunday at W5AHI. W5BH reports a new station W5AUW on 7 mc.; also W5ZZG, ex-W6DMQ, on 14 mc. W9COI is in Albuquerque, and is having his outfit shipped out. W5AHI slipped despite five regular skeds.

Traffic: W5AHI 112, W5AOD 86, W5TV 21, W5BH 1.

SOUTHERN TEXAS — SCM, Robert E. Franklin, W5OX — A number of the fellows are rebuilding to conform to the new FRC regulations. It is with deep regret we mourn the passing of our good friend, Mr. Fred Kush, W5HS, of San Antonio. We extend our sincerest sympathies to his family. W5AB-W5BBY is the possessor of a nice new ORS certificate. W5VY-ZG reports handling much traffic. W5TD now boasts a completely AC-operated station. W5BKW turned in a nice report. W5EI has been doing some nice relay work with an ORS certificate in view. W5BHO is still having trouble with his speed. W5JR has been experimenting with screen-grid detectors. W5BOC is a new station in Houston. W5AEA has been letting golf take up most of his spare time.

Traffic: W5BKW 51, W5EI 34, W5BHO 14, W5TD 8.

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5IJ — I sincerely thank all of you for your votes and the confidence you have shown in me by electing me SCM. If I can come near our past SCM, Mr. Robinson, W5BG, in his reports, I will have done well. W5WW leads the section with a whale of a total. W5HY did storm relief work in the recent Frost, Texas, disaster, advising W5TM in Hugo, Okla., as to friends at Frost. FB! W5BAM is doing F.B. O.O. work. W5BAD said the recent tornado took his shack for a ride. W5BG is keeping a sked with KFR6. W5AAE is working both coasts with a 201A on 7000 kc. W5BNN is a very promising newcomer. W5BBF reports. W5GZ expects to make up for lost time when the school closes its doors. W5RJ is rebuilding to crystal control. W5LY wants wall paper badly from some of the boys he has worked. W5BND is building A.S.G. received. W5AZP is having a hard time raising stations.

Traffic: W5HY 113, W5BAM 27, W5BAD 18, W5BQ 12, W5BNN 3, W5AAE 6, W5GZ 2, W5LY 1, W5RJ 20, W5WW 438, W5BBF 1.

CANADA

The Director of Radio, Department of Marine at Ottawa, has authorized the use of telephony in the 14-mc. band. Before using this band for fone work it will be necessary to have a visit from your local Radio Inspector, who will, on being satisfied after inspection that the station complies with the requirements, endorse the license.

Due to the midsummer season, I notice a big decrease in traffic totals. Your CGM would like to impress upon all members the importance of being on at least once a week during this period. More stations are coming on each week for our weekly get-together, so if you operate only one evening of the week make it Wednesday night for contact with Canadian stations.

CANADIAN GENERAL MANAGER
ALEX REID, VE2BE

QUEBEC DIVISION

QUEBEC — SCM, Alphy Blais, VE2AC — Our CGM, VE2BE, went to Hartford on May 2nd and 3rd to attend the meeting of the A.R.R.L. Board of Directors. VE2CA is our most active station. The N.Y.L. VE2CA handled her first message. Look in this QST and see the beautiful arrangement of VE2CA's station. Our old faithful VE2BB is going strong as ever. VE2BZ has a pure DC note on 7 and 3.5 mc. VE2AC was busy getting married and honeymooning, but he'll be on the air regularly now, coaching a future N.Y.L. operator. VE2AP has been busy with his exams. VE2AA is still chasing these elusive DX stations. I would like to hear from anybody desiring to become an amateur. Possibly we can give the newcomers a hand and speed them through their first steps.

Traffic: VE2AC 54, VE2BE 26, VE2BB 15, VE2CA 12, VE2BZ 5, VE2BG 11.

ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE3FC — Central District: VE9AL leads the way in traffic again this month. VE3GT worked VK using 4 201-A tubes as oscillators in the TNT circuit with but 180 volts on the plate. VE3DW is still hammering away with his single 201-A. VE3AD will be up in Muskoka with a portable station during July and August. VE3VS is getting ready to leave for the North, where he will operate a station at Orient Bay for the Forestry Branch Fire Ranger Service. VE3GM is preparing to use 'phone on the 14-mc. band. VE3CB reports that VE3DD has vamoosed for the Forestry Service in the North. VE3DA is busy with the militia. Northern District: G. V. Lawrence, VE3ET, ASCM — Our new man, VE3HD, is having a grand time on 7 mc. VE3BD is putting in DC. VE3DM is rebuilding to TNT. VE3HU will soon be going better than ever on 7 mc. VE3ET paid a short visit to VE3DM and VE3HD, and was treated royally. VE3BH's sked with VE3AR is not working very well. VE3GC is ditching the B batts in favor of a transformer and rectobulbs. VE3ET has moved and, for the summer, reports should be addressed to him at Norembega, Ontario.

Traffic: VE9AL 32, VE3GT 30, VE3VS 10, VE3CB 8, VE3GM 3, VE3DA 7, VE3HD 4.

PRAIRIE DIVISION

MANITOBA — SCM, A. V. Chase, VE4HR — VE4BQ has moved from Winnipeg. His new QRA is Calgary, Alta. A welcome reappearance on the air has been made by VE4DY. VE4RR has been assigned the official call VE4AE. VE4HV would like QSO with the Winnipeg gang on 7 mc. VE4GL has now got his TPTG working in fine shape. VE4DK has gone to Camp Borden for a three months' course in flying. VE4JB has been getting prepared for the forthcoming 28-mc. tests. VE4DY promises to be on the air next month.

Traffic: VE4DJ 12, VE4HR 9, VE4BU 3, VE4DY 1, VE4AE 1.

QST

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — VE4BB is now an O.R.S. VE4BX turns in the best message total. VE4BL follows close behind. VE4EF has left for Winnipeg. VE4GR reports a hamfest between the Saskatoon and Biggar gang at Biggar. Spring work and rotten weather have kept VE4IH out of the traffic. VE4GO is building a new power supply. VE4FC is on when time permits. VE4HO and VE4HY have amalgamated.

Traffic: VE4BX 17, VE4BL 16, VE4GR 1.

VANALTA DIVISION

BRITISH COLUMBIA — SCM, J. K. Cavalaky, VE5AL — VE9AJ is continuing to broadcast weekly bulletins of local doings in the Ham game. VE5CF is burning the midnight oil over the week-ends. We regret that Bert King, the famous Java King of VE9AJ, is leaving for the South, and wish him the best of luck. VE5BE is on again after plenty of remodelling. VE5BC has junked his screen-grid receiver. VE5CR still keeps his set perking. VE5EF has been heard on fone. VE5AL worked a balloon and a ship, and is now looking for a submarine. Hi. From Prince Rupert we learn that VE5GT is making his Xtal perk with nice results. He was visited recently by VE5FI. VE5CM has gone to sea. VE5DX is doing nice work. Victoria — We offer our congratulations to VE5CO, who is being married shortly. VE5DU is hitting out fine with his TPTG. VE5EC says his old 202 has lost its punch, so is putting in a 210. New stations in the city are VE5AD, VE5HR, VE5DY, VE5HP and VE5CB. VE5HR is using a 201A. VE5AD is on 3.5 and 7 mc. using a 210. VE5CB is going strong with a 210A.

Traffic: VE5AL 24, VE5CF 9, VE5CR 3, VE5GT 12, VE5HR 5.

ALBERTA — SCM, Fred Barron, VE4EC — DX is with us again, gang, in spite of the poor weather conditions. VE4EA worked two ZL's and a K6. VE4GD hooked up with OA4Q on 14 mc. VE4BQ, formerly of Winnipeg, is now active in the South. Ex-VE3AI is awaiting a VE4 call. VE4CE and VE4IO are looking for DX, or what have you. Mrs. VE4EI again tops the list for traffic. VE4GK sends in a nice traffic total. VE4BV has been receiving some very pretty poetry. Hi. Hi VE4BJ is a new local. VE4GY is also a new ham at Fort Saskatchewan, using M. G. VE4DZ is QRT, due to lack of time. VE4AF is still working with Xtal control. VE4HM is active when possible. VE4HC says things dead around his shack. VE4EC has not been doing much, but always expects to. Hi.

Traffic: VE4EI 29, VE4GK 21.

MARITIME DIVISION

NEWFOUNDLAND — Acting SCM, E. V. Jarrett, VOSZ — We take pleasure in congratulating VOSMC, our first W. A. C. VOSWG is coming South, and hopes to visit most of the local boys. VOSAW gets excellent reports with his new rig on 14,000 kc. VOSMC has begun experimenting on 28,000 kc. VOSZ put up a new voltage-fed Hertz and worked Argentina on 14,000 kc.

Strays

Boyd Phelps, known since 1921, as BP, appropriately has the call W2BP, and spends his summers in Minnesota where he operates W9BP. He says the formula for getting the same call as your initials is to wait until the chap with the desired call dies, then get him to sign over his old license (We want more information on this point, BP.), hold it until it has expired one day less than six months, have no other station license, file a new application with the expired license, and pray.

In disclosing this we hope mortality will not be increased among us because we hold a much coveted call.

Calls Heard



ON R470, M. de Waepenaert, 22 Rue des Soeurs Noires, Termonde, Belgium

14,000-ke. band

w1aa w1abg w1abw w1af w1afd w1agi w1akg w1amq w1aqf w1asf w1av w1aze w1bf w1bh w1bjn w1bke w1bux w1bw w1caw w1eck w1ew w1dp w1es w1jv w1lg w1mp w1qv w1uj w1vz w1we w1wv w2aww w2aed w2adp w2af w2ay w2afw w2afu w2ag w2ahz w2ai w2ajb w2ajj w2amm w2amr w2aoo w2aow w2aoj w2arj w2arj w2ary w2auu w2aww w2ayj w2bbp w2bda w2bey w2bia w2bih w2bka w2bla w2bok w2bon w2brou w2bwy w2bwc w2euq w2el w2fp w2ku w2mb w2oa w2ov w2qn w2rs w2sn w2ag w3adu w3ads w3afu w3ake w3aqg w3aqi w3atj w3auo w3bhv w3dh w3jw w3ln w3bm w4af w4akb w4akj w4gw w4pz w4ql w8adn w8bbp w8bet w8bez w8baz w8bf w8bjv w8bfp w8bkh w8bsl w8bvw w8cew w8cd w8eg w8dld w8dpo w8dxo w8es w8em w8hx w8kr w9an w8sl w8aze w8bba w8bfv w9cix w9mt cnsrus aulbz emsf fm8er fm8fs fm8rit fm8tui lu9dt nj2pa py1ed py2ay py2bg velas velbr velco veldr ve2bb ve2bd ve1bd ve1bd ve6ao vk2av vk2lx vk2ns vk2r vk2wu vk2xw vk3go vk3pa vk4r vk4qre ve8mc vu2zx su8rs zl2bg zl3as zl3bb zl5d z55n z55w zt5r

H. T. Petersen, "Frib," Ostergade, Norresundby, Denmark

7000-ke. band

Heard in Sumatra

w6jn w6eqf w6elm w6ac w6awp wpm k1xa k1zc k1pc k1pr k1hr k1cy k1el k1dj k1em k1he ac2ff ac9gh a6go eslab j3ck om1tb pk3pr vk2ow vk2hm vk5hg vk5wr vk5mj vs3ab vs6ah vs7ap

Heard in Singapore, F. M. S.

ne8ls fo3sr

Heard in Indian Ocean

kalhr kalce vk2lv vk6wi vk3dx

Heard in Suez Canal

diva ear98 f8rsb i1fg oh2kz on4uu paouv

W8HX, C. G. Mellor, 274 W. Calthrop Ave., Syracuse, N. Y.

7000- and 14,000-ke. bands

s2ab ce3dg ce3dj ce5aa cm2sh cm2jh cm2it cm2yb cm5by cm5ex cm5fl cm8uf cm8qb cm8cs et1aa et1bd et1bx et1by d1ep et2aa et2am et3ab ex1af ex2ak ex7 d4abg d1xn et1ar110 ear113 ear21 ear152 f8ag f8bhv f8br f8es f8et f8da f8dh f8dme f8dot f8ef f8er f8ex f8fr f8gq f8jg f8k f8s f8oa f8olu f8pm f8prw f8rex f8rhj f8suu f8swa f8d fm8er fm8gke g2ao g2bm g2dz g2gf g2gm g2p g5by f6s g5m g5ms g5yg g6ia g6lb g6lk g6pa g6rb g6vp g6wt g6x g6xq ha8b he1fg he1jg he1jli he2jn i1ll k1aaan k1akv k1dk k1kd k1bce k1ewb k1eqm k1alm k1bhl k1lsr k1te k1f5 k1f6 lu1ba lu1jf lu2aa lu2ad lu2bj lu2ca lu2dj lu3de lu3dh lu3fa lu3fk lu3oe lu3pa lu3td lu4dq lu5bh lu5ch lu5dh lu5dy lu5en lu9ee lu9dt nn1ic nn1sc nn7e u2pa oa4j oa4l oa4p oa4q oa4t oa7ab on4fp on4ft on4gn on4he on4j on4jg on4jx on4ka on4ro on4u on4uz oz7y pa0aw pa0qf pa0zf px1 py1as py1ah py1aw py1el py1em py1de py1ii py2ad py2ay py2ba py2bf py2bg py2bk py2em py2ig py2ih py2ik py2qb py3ah qqla rx1aa sn1aa

sp1ae su6w ti2ea ti2fg tg1jc velal velam velap velar velibr velce velco ve2aa ve2ak ve2ap ve2ak ve2ar ve2bb ve2be ve2bn ve2cg ve2bc ve3bg ve3cm ve3dr ve3eo ve3ft ve3ta ve4ai velai velb ve4be ve4bg ve4cs ve4ct ve4cu ve4ck ve4ex ve4dq ve4ec ve4ek ve4el ve4fc ve4fx ve4gf ve4go ve4hg ve4hr ve4th ve4ur ve5al ve5ao ve5aw ve5bl ve6qj vk2ay vk2bh vk2ki vk2no vk2rf vk3ac vk3es vk3go vk3jk vk3kl vk3pp vk3rg vk4bh vk4cg vk4dh vk5hg vo8ae vo8an vo8aw vo8mc voq2bh x1g x2r x9a zl1aa zl1ak zl1ft zl2ab zl2ac zl2d zl2gl zl2gq zl3ao zl3am zl3bb zl3bt zp7ab zs1p zs2n zs3r zs4a zs4m zs4n zs5u zt1j zt1r zt3am zt5r zt1d zt6n

W9BFW, Chester Rector, R. F. D. No. 1, Tipton, Ind.

3500-ke. Phone band

w1aby w1amq w2baj w2boz w2bqy w3aece w3aid w3ain w3ani w3dsz w3ev w4ee w4eh w4hn w4id w4pd w4qz w4vk w5ajw w5er w5kx w6das w6kp w7acj w7ce w8adx w8ahs w8ajh w8akf w8af w8aou w8arh w8awl w8azo w8bas w8bf w8bie w8bik w8bir w8bix w8buv w8byr w8bzo w8ejd w8ek w8elx w8emd w8esa w8evr w8dbq w8diz w8loc w8ndn w8dsi w8dsn w8dwx w8fn w8ha w8ia w8jh w8rd w8wf w8wm w9aid w9auv w9bbs w9bei w9bjw w9hyp w9daj w9dtu w9dwi w9efw w9ea w9eng w9etd w9fke w9fle w9fr w9get w9ghx w9mk w9mm w9qy ve3rf

W2BER, David Paxton, 15 Thompson St., Troy, N. Y.

14,000-ke. band

w6ac w6al w6akf w6amp w6an w6aoe w6aqq w6azl w6ban w6bk w6bix w6box w6bto w6chy w6ctp w6cyb w6dlt w6dgn w6dqg w6dmk w6dpa w6dte w6fieh w6fpb w6epi w6eug w6epw w6h6 w6id w6jp w6kb w6kt w6kv w7aw w7ait w7amo w7anx w7ek w7if w7je w7mu w7qy w7sg w7ty ve6ao ve5aw ce3ag ce5aa cm8uf f8ef f8ex f8em f8fr f8cs f8hr f8lgb f8prw f8rx f8sm g2gm hc2jm k4kd k4ctf oa4j on4p on4t on4us x9a

W9AZY, Carl Newman, 402 Tenney Ave., Louisville, Ky.

3500-ke. 'phone

w6bik w6cme k4dk k4kd k5dd k6avl k6dv k6eqb k6ewb zl1aa zl1fe zl1fd zl1bn zl2ae zl2bg vk2ns vk3bq vk3es vk3ls vk3pp vk3wx vk4bh vk3hl vk3ml vk5wr vk6sa vk7ch he1fg ok1na f8er f8rit f8xz nn7c wfa slap pxe g5by

N1DN, Delbert Miller, aboard U.S.S. Tennessee, Guantanamo Bay, Cuba

7000-ke. band

ab6 g5by he1fg kalce kalhr kalpw ka1dj k1qv k1acf k4kd k1f6 nn1ic nn1sc s1az ve4gd vk2jk vk2ow vk5ofr vk7ox vk2ev vk3pp ve3dd kaldo w1cow w1cte w1mk w1rv w1ags w1bbz w1bil w1rd w2aor w2amr w2bo w2bau w2are w3anh w3aws w3adx w3bm w3ant w3mv w3asw w4nn w4gk w4dt w4aih w4qy w4ct w4akp w4lj w5is w5ahq w5eq w5ain w5ann w5bj w5baw w5es w5ic w5rx w5eq w5ay w5asw w5bhq w5bki w5wu w5ea w5ap w5bkg w5aqx w5lva w5aao w5pa w5cbx w5bld w6edt w6ait w6alx w6am w6amw w6aoa w6ata w6aw w6aw

(Continued on page 74)

Correspondence

The Publishers of QST assume no responsibility for statements made herein by correspondents.



The New Regs

Kennedy, Ala.

Editor, QST:

I am very much elated over the new regulations, and believe they are a decided step forward. I have kept a log of every transmission I have made since I went on the air, and don't see how any ham can operate with any satisfaction without keeping one.

One thing about the new rules — I am one of the chaps with no filter but a rectifier, so must add the filter. Hi! Good-bye r.a.e. for me, and here's hoping the others with r.a.e. and a.e. do the same thing, for I know we will have more operating enjoyment if the bands are not crowded out with a.e.

— M. H. Gravlee, W4AG

From an O. O.

Sorento, Ill.

Editor, QST:

As an Official Observer, I have sent out more than 200 cards to off-wave stations during the past six months, and while engaged in this work it has dawned upon me that a little comment on the subject of answers to these cards is in order. Many amateurs write and advise that they were accidentally out of the band and will be found where they belong in the future. Fine; that's what we want to hear.

Now here is where the rub comes in. A great many of them will write, and in doing so will request answers to their letters and in many cases some information; now if these hams want answers they should be courteous enough to put in a stamped, addressed envelope for the convenience of the O. O., and be sure that they really need answers before writing. Although we all like to correspond with our friends of the key and mike it will be appreciated that 50 or 60 letters in a month take stationery and time, to say nothing of postage. All this comes out of the O. O.'s pocket.

For the benefit of those who are profiting by our work, I wish to list the following points:

1. When we say your call was heard, that call was the one. There is no guess work; we check and re-check and (as Andy tells Amos) "double-check," so if you were not on, someone was *with your call*. We appreciate that no one likes to be accused of off-wave operation who isn't guilty, so naturally we listen until certain of the call.

2. If your call was heard and you were not operating, write the O. O. and tell him, but don't ask him to hunt the pirate. Notify your supervisor. He has men to check up on unlicensed operation. The O. O. is glad to get the letter and know you were not guilty, but hasn't time to play detective.

3. If you have some technical questions or want some information, enclose a stamped, addressed envelope; the O. O. will appreciate it, and I'm sure he will be a good sport and answer it if possible. Of course, if you want to know about adjusting a transmitter or anything of that sort write to the A. R. R. L. Technical Information Service or to some other information bureau, or better still ask some nearby ham to help you, but be sure he knows the construction and

W1AXV's Transmissions

Saranac Lake, N. Y.

Editor, QST:

I wish to state that I took advantage of W1AXV's offer to measure any amateur frequencies. I read of it in the May issue of QST and worked him on the May 2nd, Friday evening schedule.

This is a very valuable service and I, for one, greatly appreciate it.

I have a high "C" frequency meter as described in November QST and I use all the standard frequency transmissions to check up on its calibration every week.

Many thanks to the staff at W1AXV.

— J. T. Dowdell, W8DSA

An Invitation

2 Chepstow Road, Croydon, England

Editor, QST:

We should like, through the medium of QST, to invite and welcome to Croydon, all transmitters who intend visiting England during the coming summer.

Ring G5BY at Croydon 2578 any day about 7 p.m., and we will do our best to give all a real good time.

— Geo. G. E. Bennett, G5BZ,
A. L. O'Hefferman, G5BY,
for "The Croydon Gang"

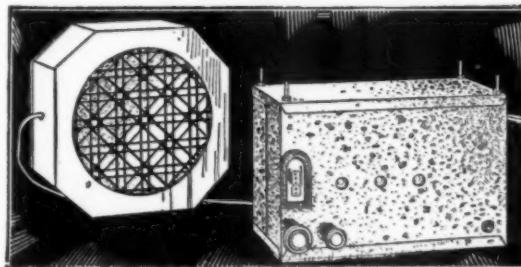
SM

You'll Know When You Hear It—This Is The Real "Auto-Set"

Three Screen-

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Direct Tuning



S. G. Power

Detector

Sensitivity

On the market since June 1st, the S-M 770 Auto-Set has proven itself to have everything:

1. SENSITIVITY — 2.5 to 14 microvolts per meter (an average of 8 over the broadcast band). That's one of the things that makes possible real console-model reception.

2. THREE SCREEN-GRID TUBES — giving you console-model wallop.

3. SCREEN-GRID POWER DETECTION — as you know, five times better than a '27 detector!

4. ABSOLUTE TUNING — directly through a regular S-M 810 illuminated drum dial, eliminating dubious control through a "remote" shaft—another feature exactly like the finest console.

5. SMALL SIZE — 12 inches long by 7½ inches high and 6½ inches deep — a pocket edition expressly designed for its job.

6. NO CUTTING UP THE CAR — mounts on brackets under the cowl to the right of the driver's seat where the dial and controls are easily seen and accessible.

7. SPECIALLY DESIGNED SPEAKER — 9½ inches wide and only 3 inches deep, magnetic, with matched impedances, fitting under the cowl to the left of the receiver.

8. RESISTANCE-COUPLED DETECTOR — giving fidelity fully equal to modern full-size receivers.

The S-M Auto-Set was designed by the world-famous Silver-Marshall laboratories to give absolutely everything regardless of price — but the price is remarkably low:

S-M 770 Auto-Set complete, except for tubes (3-24, 1-12A, 1-71A) and speaker, \$79.50 list. Parts total \$61.40 list.

S-M 771 Auto-Set Accessories, including all necessary installation equipment except tubes and batteries, \$17.50 list.

S-M 870 Automotive-type Magnetic Speaker. Complete with mounting brackets, \$15.00 list.

The New Short-Wave 737 Shows What a "Bearcat" Is

Designed to lick anything in the short-wave class, the 737 Bearcat does — and how! It has two screen-grid tubes — will reach out and drag 'em in by the heels — is plenty selective — and you can spread the ham bands without taking the set apart and throwing half of it away. It's completely shielded — has its own cabinet — and its own built-in power supply!

Eight specially-designed plug-in coils (included

in the list price) cover from 16.6 to 200 meters — all foreign and American short-wave broadcasting as well as the ham bands. Four extra coils (\$5.50 list) cover the American broadcast band. What more could you ask?

Tubes required: 2-24, 1-27, 1-45, 1-80.

737 Short-Wave Bearcat, completely factory-wired and tested, less tubes and speaker, \$139.60 list. Parts total \$109.50 list.

The Radiobuilder, Silver-Marshall's publication telling the very latest developments of the laboratories, is too valuable for any setbuilder to be without. Send the coupon for a free sample copy. If you want it regularly, enclose 50c for next 12 issues.

4,000 Authorized S-M Service Stations are being operated. Write for information on the franchise.

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Silver-Marshall, Inc.
6409 West 65th St., Chicago, U. S. A.
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... 4c enclosed; send Data Sheets on 737 and 770.
... 10c enclosed; send five new S-M Data Sheets (including the 737).

Name.....

Address.....

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operation of radio apparatus himself — some don't.

4. A notification that your station was off-wave does not mean that your license, O. R. S. certificate or anything else will be cancelled, but don't be careless about it, for after three or four reports showing continued off-wave operation in the face of notification this is the best you can expect. Always answer an off-wave card, for that is the only check we have; and unless you do we take it for granted you were operating. If you were not, and we do hear you later off-wave, you get two black marks where only one is deserved.

5. The observer isn't trying "to get something on you." He is trying to preserve your operating privileges and the privileges of all other amateurs, and you should consider that you are lucky that the R. I. didn't happen to be listening in instead.

I have any number of very friendly letters from the many hams I have notified, and appreciate them very much. I have answered a number of letters requesting information and am glad to help a brother ham whenever possible. Considerable time is spent here in checking, and this comes off the time I might be working myself; thus you can appreciate why I must be brief in handling notifications.

One point I must add here: a great deal of off-wave work is the result of using one of the condenser and coil frequency meters and having enough error in the check to spell the difference between the right and wrong side of the fence. A heterodyne frequency meter is the best bet, and no ham who uses one is found off-wave, providing it is properly calibrated.

We must get inside our bands and stay there. The O. O.'s are doing their bit; give them your co-operation.

— T. R. Pugsley, W9BNR

A Lucky Chance

Editor, QST:

A couple of months ago, we happened to be in Cook's Strait, New Zealand, en route from Auckland to Wellington. While in Auckland I had visited ZL1FW and some of the others and believe me, they treated me fine and came down to look over the arc on WQBV.

The other night after leaving I was listening in on the old short waver and heard my friend Earl Wiseman of W6BBR working 1FW. Eric told him that W6CHT had visited him the night before and after signing off, Earl called W6BVS, another member of the Hollywood gang, and told him I was in New Zealand.

"Well, that's fine," said Bivis, "maybe George is listening to me now. Hello OM." and he sent a nice long message with all the latest dirt.

Maybe that didn't make me feel FB! It was just like a letter from home and had not been prearranged. BVS just had enough faith in his old fifty to try a "blind" message, and it got through.

— George Derry, W6CHT, WQBV

SPRAGUE



*Here you SEE
why it's
Years Ahead!*

JUST glance at the diagram here, and you'll see Sprague superiority at a glance. Notice the exclusive, one-piece, round-edge anode—no soldered or welded joints either above or below the solution.

See the breather vent sealed by a soft rubber nipple, inseparably vulcanized to a hard rubber top—an absolutely leak-proof one-piece construction.

Don't miss the screw threaded, individual mounting—adapting the Sprague condenser to all types of sets.

And then bear in mind that its 8 MFD capacity is concentrated within a space of 1 1/8" diameter x 5" overall. Giant capacity in midget size.

SPRAGUE SPECIALTIES COMPANY
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Manufacturers also of the well-known
SPRAGUE PAPER CONDENSERS

Electrolytic
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Capacity
8 MFD
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The Eveready Raytheon Foto-Cell is a long-life transmitting tube for talking pictures and television. It is also finding new industrial uses every day, such as paper testing, color matching, automatic counting, control of illumination and many others. In several standard types, or made to specification.

The Eveready Raytheon Kino-Lamp, for television reception, has uniform glow over the entire plate, and its reproductive qualities are perfect without the need of mirrors or ground glass.

Write, if you are interested in talking pictures, television or Foto-Cell applications of any kind. *Free* — Eveready Raytheon Technical Bulletin No. 1, dealing with the Kino-Lamp, and No. 2, covering the Foto-Cell.

• • •

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CQ Again

838 Hauser Blvd., Los Angeles, Calif.
Editor, *QST*:

If I am not mistaken there was once upon a time printed in *QST* a letter upon the subject of "CQ". Judging from the noises in our 20- and 40-meter bands I think it's about time for another one.

A "CQ" is all right in its place, and there are times when rather long calls are justified. However, there's a limit. My particular pet peeve is the lad who persists in blitting out a string of "CQs" from fifteen to forty in length. His usual procedure is to slur the signature a couple of times, and then start another series.

But this pest is not the worst. The operator who really deserves the guillotine is the one who breaks the monotony of his endless "CQ" with drawn-out inserts of "dah did dit, dah dit dit daahhh — ." He usually pulls this stunt during those limited periods of the day in which DX is good, and consequently time is rather precious.

For goodness sake, gang, let's see if we can't get rid of these nuisances. And in the meantime, let us limit our own "CQs" to not more than five without a signature, and let's be especially careful never to "CQ DX" without immediately signing our call and hence indicating what is DX in relation to our QRA.

— *J. Lee Smith, W6AWP*

QSP

1216 Utah St., Toledo, Ohio

Editor, *QST*:

There is a little matter which I have had on my mind for quite some time. I am an old ham, having been in the game way back when . . . and therefore ought to know what I am talking about. The matter I wish to speak about concerns the old custom of handling messages.

It seems that some hams have absolutely no scruples about messages at all. They will cheerfully take one and then as cheerfully forget about it. They don't care whether it gets to its destination or not. What shall we do with this kind of a ham? The answer is, nothing, because it is a matter of honor and nothing else. We give a message in the faith that it will be relayed in the near future; but whether it is or not we do not know.

Just the other day I was talking to a ham about this matter and he said to me, "I'll tell you what I do with most of messages." He said, "I throw them in the wastebasket."

Now, I ask you, is there a spark of manliness in this kind of an operator? I think he is a disgrace to the fraternity. The least a ham could do would be to say that he does not want to QSP and let it go at that.

With me it is a point of honor to get the message away, no matter if I must send it by mail. Recently I had a message for California and could not get rid of it so I sent by mail, since it had to be there by New Year's. One thing I always tell my brother hams is that if they ever give me a message, they can depend on its getting through.

— *Spot Neubrecht, WSBTM*

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Weston Model 506 Resistance Meter

WESTON announces a miniature instrument for radio service men's use, known as Model 506 Resistance Meter. By means of this instrument direct indications can be obtained of resistance values from 10 ohms to 10,000 ohms. It can also be used for making continuity tests.

The Model 506 Resistance Meter operates on two flashlight cells or any other 3-volt D. C. supply. To use this instrument it is only necessary to make a series circuit of the meter, the 3-volt battery and the resistance to be measured.

This instrument is enclosed in a standard 2" panel type case for flush mounting. It has an etched "volt-ohm" scale. It can be mounted on a panel or used in a portable unit by placing it in a small box together with the two flashlight cells.

For complete information and prices, write direct to the factory, Radio Engineering Dept.

Weston Electrical Instrument Corp.
602 Frelinghuysen Avenue, Newark, New Jersey

Weston
PIONEERS
SINCE 1888
INSTRUMENTS

I.A.R.U. News

(Continued from page 46)

de Neck, we will be glad to receive opinions from the other sections.

BRITISH NOTES

By J. Clarricoats, G6CL, Honorary Secretary, R.S.G.B.

British amateurs join with those of the world in expressing their sympathies with their German colleagues in the untimely death of Dr. Wilhelm Titius, the illustrious Editor of their official organ "CQ."

Such losses are inevitable, but the gap left is always difficult to fill; we sincerely trust that one as keen and loyal to the Amateur Cause will shortly be found to take his place.

The results of the British 28-mc. tests are almost complete, but the difficulty of making a thorough investigation of each claim has retarded the progress somewhat.

We can, however, announce that Mr. J. W. Mathews (G6LL), the best known of all British ten-meter amateurs, has won the Powditch trophy.

Mr. Mathews' success and the success of the tests generally was only brought about by the whole-hearted coöperation of the amateurs of the world, and through the medium of these notes we thank all who have assisted us in this organized attempt to probe more deeply into the mysteries surrounding the 28-mc. band of frequencies.

To our President, Mr. Gerald Marcuse, we owe a debt of gratitude. Through his efforts we have been granted permission to operate our stations between the hours of 1500 G.C.T. on Saturdays to 2400 G.C.T. Sundays, in the wavebands around 75 to 85 meters.

This permission is granted to all holders of Trans-Oceanic licenses and will be extended to such others of our members who apply through the Society. We hope the opening up again of this band will result in the removal of much local work from the overcrowded lower bands.

Conditions on the 7- and 14-mc. bands were in general worse than previous years. No important work has been recorded.

We have the pleasure of stating that the B.E.R.U. continues to extend at a rapid rate. Iraq is now a firmly established link in our chain of Empire groups.

We shall be glad to forward particulars of membership to anyone interested. Our Headquarters are at 53 Victoria St., London, S.W. 1.

We had the pleasure of a visit at Headquarters from Mr. J. L. Leistra, PC2, of the Hague, Holland, during the writing of these notes. It was a most enjoyable occasion for us.

RCA

Radiotron

UV-851

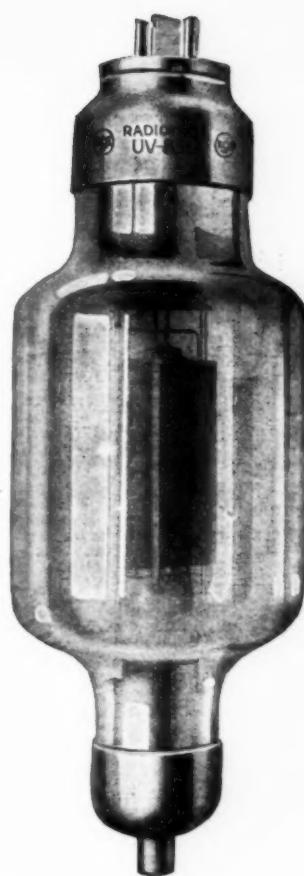
A General Purpose Tube for High-Power Amateur Stations

Modulator, Power Amplifier, or Oscillator—in whichever of these ways amateurs choose to use Radiotron UV-851, they will be delighted with its powerful behavior.

Its ability to modulate without distortion 400 watts of oscillator input power in radiophone transmitters: to handle 100 watts of undistorted power output as an audio amplifier: to deliver 1000 watts of useful power output as an oscillator at 3000 kilocycles or below: or to supply 1000 watts of peak power output as a radio-frequency amplifier—these are the operating characteristics which make Radiotron UV-851 such an excellent all-purpose transmitting tube.

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write*

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Filament Volts	11
Filament Amperes	15.5
Amplification Factor	20

Modulator

Plate Volts	2000
Grid Bias Volts	-80
Plate Current (ma.)	105
Plate Resistance (ohms)	2300
Max. Plate Dissipation (watts)	600
Osc. Input Watts for each UV-851 (Mod. Factor 0.6)	400

Oscillator and R. F. Power Amplifier

Max. Operating Plate Voltage	
Modulated DC Plate Volts	2000
Non-modulated DC Plate Volts	2500
Max. DC Plate Current (amps.)	1.0
Max. Plate Dissipation (watts)	750
Power Output (watts)	1000

GERMAN SECTION

By W. Rach, D4ADF, Sec'y, D.A.S.D.

Can you turn back the pages of time?

If you have the 1920 series of *QST* — and probably you have not — you are one of the few. Even 1922 and 1923 copies are getting scarce. And copies before the war! Well, let's change the subject.

A few years from now *QST* copies of to-day no doubt will be just as scarce. Every reader of *QST* appreciates its reference value. We are daily reminded of this fact by the many requests we get for back copies, many of which we cannot supply.

Next year — or probably later this year — you will be looking for a certain 1930 issue of *QST*. You had better resolve right now to keep your copies in a

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Dr. and Mrs. Wilhelm Titius

It is our unhappy duty to record the sudden death of Dr. Wilhelm Titius, editor of the German organ "CQ," and council member of the German I.A.R.U. Section, the D.A.S.D.

Dr. and Mrs. Titius met their death in a disastrous motor accident on April 11, 1930.

Dr. Titius was one of the oldest amateurs in the country. Through his death German amateurs lose a good friend and a valuable co-worker, whose real amateur spirit was known everywhere, and it will be very difficult to fill the gap caused by his sudden death.

In the passing of an esteemed contemporary, may we point to the monumental work he has achieved, and convey our sincere personal desolation and regrets to the bereaved, and our mourning German friends.

On June 7-9, 1930, the fifth annual German amateur convention will take place at Halle a/S. Here is the program:

Saturday, June 7th. 8:00 p.m. Official opening at the Hotel Rotes Ross.

Sunday, June 8th. 11:00 a.m. Business meeting and lunch.

Monday, June 9th. Lectures on various subjects.

Tuesday, June 10th. Visit to the Institute of Technology, of the high frequencies at Koethen.

It is hoped that many amateurs from all parts of Germany and Austria take part in the convention, and, of course, all friends from abroad are heartily invited. We should appreciate a short note from any of our foreign friends who are likely to attend the convention.

Activity on 3.5 mc. has increased somewhat during the period covered by this report, D4ABV, D4GT, and D4GL having been heard by the Silesian stations on this band, while D4ADF of Berlin and D4UAB of Bamberg are carrying out regular tests on "80."

14 mc. has been most unsuitable for DX the last few weeks, only a very few South Americans having been heard here on that frequency. Nevertheless D4BY succeeded in establishing about thirty contacts with the Aussies and Zedders.

DUTCH NOTES

By H. Pomes, Ass't Traffic Mgr. N.V.I.R.

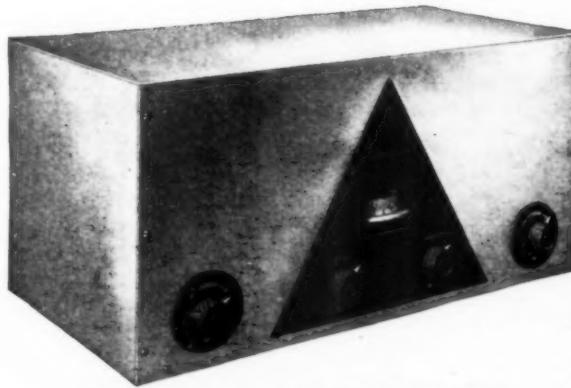
The 'phone business still remains the same, big activity on 40 meters and only a few men on eighty. Several Dutch hams organized 'phone tests in this latter band, and one after another

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finds out that it is not so bad after all, for this kind of work.

In the 7-mc. band circumstances have been pretty good for communication with European, East Asian, and North African stations, but DX stations were seldom heard and were not worked. Usually about midnight all reception is restricted to some local stations.

The 14-mc. band offered many fine occasions for DX work, especially on April 5th, 6th, and 7th for communication with the U. S. A. PAODW is crystal-controlled now, and works with his new transmitter almost every station he hears. PA0ZK and PA0ZF had several fine DX QSO's. PA0QF had a sked with PK2AJ and worked him several times during two or three hours. On April 7th he worked all continents; he surely keeps a record in putting pins in the map on the wall!

Every day Asia and Australia may be heard until 1800 G.C.T.; then African stations become audible, though not so loud as in the preceding period. After sunset American stations are heard, especially the South Americans at about 2300 G.C.T.

On 28-mc. SUSR and PA0VN are heard.

There are several Dutch hams who are equipped with crystal-controlled stations. The number of licensed amateurs still increases, and many others are preparing for the exams. If matters go on in this way all will have gotten their official certificate by the end of the year.

J. Clarricoats, Hon. Sec. of the R.S.G.B. and B.E.R.U. has communicated to us a suggestion made by Dr. Curt Lamm, D4AFA, of the D.A.S.D., to the effect that wherever possible, contracted forms should be used when giving QRAs to DX stations. These abbreviations are intended to take their place in the already extensive ham vocabulary of abbreviations as a group for international use primarily. We are printing the two lists enclosed with the suggestion, one each for Great Britain and Germany. At the same time we request all I.A.R.U. member societies who may be impressed with the usefulness of the idea to make up and forward us a list of their important cities, and a contracted form for each. The following lists will serve as a basis upon which to work, if the scheme is deemed worthy of universal consideration.

Great Britain

London	LDN
Manchester	MCR
Glasgow	GLW
Birmingham	BHM
Bristol	BTL
Edinburgh	EBORO
Newcastle-on-Tyne	NWC
Liverpool	LVP
Dublin	DBN
Coventry	CVY
Belfast	BLFT
Cambridge	CAM
Germany	
Berlin	BLN
Hamburg	HMB

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Condensers, Mica, op. volts 0.500 cap. .004
Duplicator, new. **\$17.50**
Duplicator, used. **15.00**
Wireless spec. New. **15.00**
Wire spec. Used. **12.50**



Transformer, West. Elec., output, No. 102A, 4 to 1 ratio. **\$3.50**
Transformer, West. Elec., output, No. 202A, 5 to 1 ratio. **\$3.50**
Transformer, West. Elec., input, No. 201A, 7 to 1 ratio. **\$3.50**



Coil, Retardation, West. Elec. Co. 57C, .83 ohm, 3 windings, .08 henry. **\$1.00**
Ret. coil West. Elec., No. 44, 1800 ohm, 12 henry. **\$2.00**
Ret. coil West. Elec., No. 44, 85 ohm, 1.3 henry. **\$.50**
Ret. coil West. Elec., No. 48, 11 ohm, 1 henry. **\$.50**

Motors 1-30 H.P. back geared 110A, C. variable speed, auto reversible (Socony oil burner type) has over one thousand uses, a very good buy. Regular price \$35.00. **\$7.50**

Edison storage battery cells, nickel alkali, 225 amp. hour, 1.2 volt type A-6, weight per cell 20 lbs. **4.00**

Induction coil, platinum contacts, (Hi. pitch buzzer) **1.50**

Magnets, Army mine and ringer type, 4 large magnets **1.00**

Magnets, 5 bar ringer (bridging type) ideal tester. **5.00**

Generators, Westinghouse 110 volt, A.C. 900 cycles, 200 watts, self excited. **15.00**

Generator 1/4 kw. 500 cycle, 300 volt, self x-cited, can be hand driven. **25.00**

Voltmeters, D.C. portable new Weston model 45, 3 scale 0-3-15-150 guaranteed 1/4% accurate. **40.00**

Loud Speaker Unit 193 West. Elec. Ideal for monitoring. Transmitter with Horn. **5.00**

Keys, transmitting, Navy, back connected on bakelite base, 2 kw., 5/8-inch silver contacts. **5.00**

Keys, xmitter, 2 kw., comb. relay and hand 5/8" silver contacts. **10.00**

Key switch, 1/4" silver contacts. **1.50**

Charging panel, Navy type, S.E. 899, 32 volt, Ward Leonard, var. and fixed res., Weston voltmeter and ammeter, Sangamo ampere hour meter. Complete with all switches. Regular price \$145. **30.00**

Receivers, S.E. 143 and I.P. 500. **100-150**

Relays, West. Elec. types, 122-AB, 122-DH, 149-T, 172-B Elec. Engineers Handbook, 1600 pages. "Foster" **2.50**

Practical Wireless Telegraphy, by "Elmer E. Bucher" **2.00**

I. C. S. Elec. Engineers pocket handbook. **1.00**

Rheostats vitrohm, variable Ward Leonard, 500 ohm .2 to 1.5 amp. 35 tap field reg. type. **.75**

Rheostats, vitrohm, variable, Ward Leonard, 6 ohm 15-5 amp. bat. charge type. **5.00**

Resistors, vitrohm Ward Leonard, with leads, ass. sizes per doz. **3.50**

Relays 2 and 5 kw. (110 or 220 volt) 5/8" silver contacts. **1.50**

Relay West. Elec. low voltage, 2 upper and 3 lower platinum point screws, 3 contact arms. **7.50**

Extra platinum contact screws or arms. **5.00**

Amplifier, W.E. Radiophone, C.W. 926, 3 Stage. **.35**

Heterodyne, Signal Corps, type B.C. 104, 1000 to 3000 meters, with detector. **15.00**

Air compressors, Kelllogg, Model T, 1 1/2 cu. ft. per min. weight 6 lbs., 600 R.P.M., 125-lb. Requires 1/4 h.p. **1.00**

SPECIAL — U. S. Army instruction book on telephony or telegraphy. Hundreds of pictures and diagrams. **1.50**

Microphone, Army Trench, sensitive. **1.50**

Microphone, Aircraft, Magna-Vox, very sensitive. **1.50**

Charging Board, 32 volt, complete with Weston No. 269 voltmeter 0-50, auto cutoff resistances, switches, etc., on slate base. \$60 value. **1.00**

Generator, airplane, Signal corps, with draft, can be used as motor, 12 volt 33.6 amps. 5000 R.P.M. **1.50**

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Ameters, D.C. portable, new Weston model 45, 3 scale 0-1.5-15-150 with 3 scale external shunt and leads 1/4 or 1% accurate. **20.00**

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Condenser, Duplicator, mica, op. volts 12,000 cap. .0004. **10.00**

Condenser, Duplicator, mica, op. volts 40,000 cap. .0012-.001. **10.00**

Condenser, Duplicator, mica, op. volts 8500 cap. .004. **10.00**

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NAVY Dynamotors General Electric 24/1500 volt, 233 mills. (Extended Shaft — \$3.00 extra). **37.50**

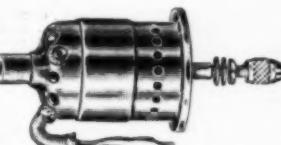
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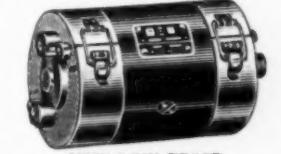
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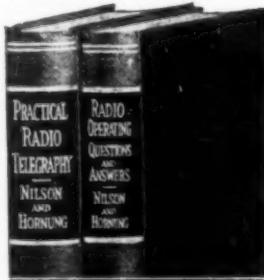
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Let's have lists from all the other countries to complete the table now.

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The following were issued WAC certificates during the year 1929: Ladislav Vydra, EC2YD; Gilmer Kirkelie, W6BZD; J. H. Robinson, W5AKN-W5BG; R. G. M. Anthony, OA5CM; Charles A. Topping, SC1AH; H. D. Huston, W9FXR; Miguel Moya, EAR1; LeRoy Moffett, Jr., W5ZAV; F. G. Calvert, FOA3C; Roger Pieton, ef8AXQ; Maurice Hupel, ef8AAP; Henry Clive St. John, VK2RX; Geo. G. C. Bennett, G5BZ; Charles P. Tennant, FOA40; Jack Kazuo Shibata, KuALM; C. J. Mumford, CT1BL; Francesco de Albuquerque (Mangualdo), CT1CF; Maxwell Kelch, W6DZD; T. A. St. Johnston, G6UT; J. J. Frederikse, enOPF; Leif Salicath, LA1G; Robert E. Carter, W6CIH; G. A. Baker, W6CHY; Masayuki Hisamotö, K6CLJ; F. Salles Botelho, SB2BG; Leo A. Paul, OA3LP; Eugene Stadden, W7IF; A. O. L. Strickers, NRDM; Alex McIver, ZT5F; H. S. Jones, W6AX; G. Emrys Jones, G6XB; H. Littman, D4FN-D4XN; Kendall Curtis, W1AKM; Eric Neilsen, Jr., SC7AA; D. C. Sayer, W2GP; D. E. Klumb, W7AFO; W. H. Treston, W3JM; R. A. Hill, ZS1A; Bruce Hoag, W8AXA; W. P. Brown, W3PF; H. V. Wilkins, G6WN; Frank Miller, VE1BR; Oscar Egenes, ZT5R; Christoph Schmelzer, D4AAR; K. Beintema, PB7; A. C. Edwards, G6XJ; V. Chennel, VK5JH; G. S. Samways, G6OH; E. T. Warner, GBVJ; H. L. Garfath, G2BM; Geo. M. Rose, Jr., W4JS; Clayton S. Waldrath, W9DLY; J. C. Stannow, OZ7Y; Leslie Carr, W9AOK; W. G. Chase, W1BKR; Keith Howard: Roy Clarke, ZL2AW; Leo Charette, W1A BD; George S. Yerbury, W2AI; Harry E. Smith, G6UH; John Koski, W6DBO; J. C. L. Edwards, G5UQ; John A. Roehm, W3ADM; L. A. Moxon, G6XN; Carl Wiedenhammer, W1ZL; J. Burleigh Scott,



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Panel Instruments for Radio Amateurs

Accurate electrical measuring instruments are the keys to achievement in amateur radio work. Amateur operators of today who are doing the worth while things are the amateurs who have acquired the habit of using electrical instruments to secure exact working data.

It may be true that a certain amount of success in amateur transmitting and experimenting can be accomplished with limited measuring apparatus, but the same amount of effort directed through the use of exact measuring instruments will accomplish immeasurably more.

Every amateur operator should have a new Jewell radio bulletin which gives certain wiring diagrams and describes the Jewell line of amateur instruments as well as radio service instruments. Mail coupon for your copy.

FREE to Amateur Operators

For the benefit of our friends in the amateur operating field, we have made a time and date chart that shows comparative time throughout the world. To secure one of them free merely mail us your name, address and call number.

30 YEARS MAKING GOOD INSTRUMENTS
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A New Voltohmmeter for Service Men

The Jewell Pattern 574 is designed especially for making rapid checks of voltage, resistance and continuity in radio service work. The 3½-inch Jewell meter has scales of 0-100,000 ohms and 0-300 volts. Push button switches decrease the ohmmeter range to 1-10 its value and the voltmeter range to 1-10 its value and also double its range.

The panel carries complete operating instructions. A 4½-volt battery mounted beneath the panel makes resistance checking and continuity tests convenient. Test leads with plugs that fit into the jacks further increase the convenience of using this instrument. The voltmeter has a resistance of 1,000 ohms per volt.

Mail the coupon for literature describing the Jewell Pattern 574 Voltohmmeter and copy of the new Jewell radio bulletin.



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1aa
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1blk
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w1p1
1yb
2afj
2api
2aur
2bie
2boa
2cvj
w2hr
2sam
3ahp
3awb
3edu
w3kt
4aeo
w4ca
w4qb
w5az
w5fj
w6ac
w6cu
w6dn
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w7ur
w8bc
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There is a DURHAM Resistance for every purpose. Write for data sheets and prices of ratings in which you are interested.

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For checking your note, its stability and whether D.C. or not. **THE ONLY SURE CHECK.** Gives you an accurate idea as to what your signal sounds like to the other fellow. The Leeds Monitor is encased in an aluminum shield, 5" x 6" x 9" overall. Completely shielded, with batteries self contained. Supplied with A. & B. batteries, but without 1-LIX 193 tube.

Special \$15.00

\$15.00

Make your own transmitting and receiving coils. Copper tubing transmitting inductance.

Size of tubing			
Inside Dia.	3/16"	1/4"	5/16"
2 1/8"	9c	10c	12c*
2 3/8"	9c	10c	15c*
2 1/2"	10c	12c	17c*

10c 12c Prices per turn

<i>Prices per turn</i>	
Thordarson B-Eliminator Transformer	\$1.65
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Leeds 50 watt socket specially priced. See previous issues of <i>QST</i> for details.	

ACME

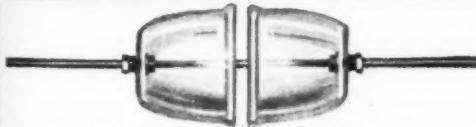
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These Filter Condensers are designed for use in filter circuits in Transmitter and all high Voltage Socket power devices and Power Pcks.

TYPE PL 571
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Special LEEDS lead in bowls made of Pyrex. Two cups size $3\frac{1}{4}$ " dia. x $2\frac{3}{4}$ " high; supplied complete with 18" brass rod and hardware. Price **\$2.25** complete

Larger size cups 6" dia. x 4 $\frac{1}{2}$ " high; complete set
two cups, hardware and 24" brass rod. **4.25**
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Tubes UX type, 30 day replacement guarantee, No. 210, \$2.25; No. 250, \$2.35; No. 281, \$1.85; No. 280, 95c; No. 245, \$1.25; No. 224, \$1.25; No. 227, 75c; No. 226, 65c; No. 171, 75c.

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Short Wave Sets, one tube complete with 5 coils, 14 to 550 meters. \$6.45

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No. 1003 Power Transformers, shielded, Sec. 600 V. for one 281, one 250, one 227, four 226 tubes and 2 chokes. \$5.00

A-C.A. B. C. Power Packs, completely assembled. \$8.75. 250 V. B. also has A. C. filament for up to 9-tube set. Can be used as B eliminator. Make your battery set all electric, or build your A. C. set around this pack. 280 tube for this pack. 95c extra.

Thordarson Transformers, 1 to 1. \$1.00

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w7atl w7bd w7be w7dp w7el w7ek w7fa w7fh w7fi w7fj w7gi w7hx w7if w7iq w7jc w7jt w7ka w7ko w7li w7ls w7mo w7na w7nh w7nm w7nr w7ny w7pg w7pr w7pu w7qb w7qd w7qr w7qy w7ri w7rp w7sg w7su w7td w7tx w7ty w7ui w7un w7vk w7vy w7wg w7wl w7wr w7zzb ce2ab ce3ac ce3bf ce3dg ce5aa ce7ac cm2ac cm2jm cm2ah cm2wa cm2xa cm2yb cm3dg cm5ex cm5fc cm6ry cm8lc cm8uf cm8yb ct1aa ct1bx ct1ew ct1af ct1fb frari g5by g5ml g5ms hel1g hel1g hc2je hc2jm kfr6 kfz1 k4aan k4akv k4dk k4kd k6alm k6boe k6dd k6ef k6ew k6ws lu1ba lu2aa lu2ca lu2do lu2fi lu3de lu3dh lu3fa lu3he lu4bi lu4dq lu5ac lu9be lu9dt lu9fe nj2pa nncab nn1ab nn1ic nn7c oati oa4o oa4q oa4r pylaa pylah pylaw pylca pyl1c pylcm pylia pyl2b pyl2ad pyl2ak pyl2ay pyl2az pyl2bz pyl2bf pyl2bg pyl2ig pyl2in pyl2q pyl2qh t12ea t12rs t12wd velas velbr velce velco veldd veldr vel2aa vel2ac vel2ai vel2ay vel2bd vel2bh vel2bq vel2bu vel1bx vel4k vel4p vel4d1 vel4ec vel4f1 vel4f2 vel4f3 vel4g vel4gu vel4gw vetha vel4hm vel4hr vethu vel4ic vel4jg vel4kl vel4vw v65ac v65al v65aw v65cp v22hu v22j2c v22nb v22ns v22w v23es v23hs v23l v23jk v23iy v23ml v23pp v23pr v23tm v23wo v24hg v25hg v25it v25os v25wr v26wi v27hs v27dx v08ae v08an v08aw v08mc x1lnq x2x x3a x9d z1bb z1be z1ac z1m z1r z1zaw z027xu xw1m qq1a hi2 dn3 wfa xda

Your Broadcast Receiver as a Short-Wave Superhet

(Continued from page 14)

that the fault was with the individual tubes. If the above figures are typical, probably four out of five Type '27 tubes will be satisfactory, although if a number of tubes are available, it is well to select the best of the lot and use it in the converter, because a tube which is hummy on short-waves will usually be suitable for use in the broadcast receiver itself.

In conclusion, we may say that we believe most difficulties can be overcome by the application of a little common sense in hunting for their cause. Once the rough spots, if any are encountered, are ironed out, the results should be more than satisfactory.

The Annual Meeting of the A.R.R.L. Board

(Continued from page 21)

that arrangement whereunder the Secretary of Commerce authorizes the operation of an amateur station by the holder until he can be personally examined but for not to exceed one year. It seems that many extraordinary "dodges" are invented by the holders to escape appearing for examination, because they know they are not qualified. With due consideration for crippled operators unable to travel and others who may have excellent excuse for not appearing, the Board voted to request the Department of Commerce to enforce the regulations on the temporary certificate, to end the abuse now existing.

The thanks of the League were voted to stations W1AXV and W9XL for their very valuable services as standard-frequency stations in the transmissions sponsored by the League. The board ordered spread upon its records a state-

w7fl
w7li
w7pg
w7su
w7wr
m2jm
m5y
freari
c4aan
k6ws
lu3he
n1cab
y1lah
oy2ak
y2qb
reldq
vesaf
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Powel Crosley, Jr., PRES. Cincinnati, O. Home of WLW - "the Nation's Station"

You're THERE with a Crosley

SOME SET!

The Hy-7 "Brought in stations I never heard before." Captain H. W. Atkins, S.S. Aryan.

"California and English 20-meter amateur fone are pie. Tuning world without antenna is new. Sydney, 2ME like local." B. H. Taylor, Haverhill, Massachusetts.

"Some set! Every other set I've had would not get any 20-meter signals." W3PT.

"I never heard anything like the HY-7. Gets signals I can't hear on my regular receiver." WIAGZ.

"Only use 5-foot aerial on the HY-7. It certainly is a greater performer." WICMP.

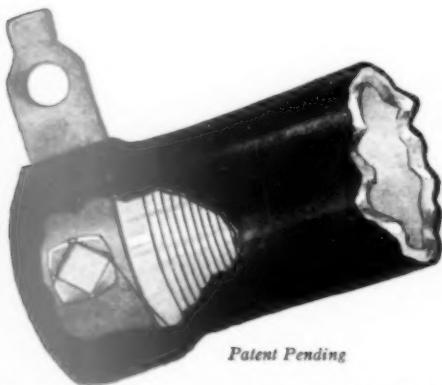
"That set is a peach, you don't say enough about it, it's worth bragging about." W1HN.

We'll let the users do the bragging. We're too busy making and improving the HY-7. Complete descriptive article 50c, gives theory and design data. Write for circular and prices on D.C. kit or either A.C. or D.C. ready-made receiver.

Special Work — Here's what H. E. Brummelle of the Chile Exploration Company says of his special HY receiver, "I have the best outfit this side of the Equator."

Also Jewell, Weston, Cardwell, Electrad, Sangan, Tobe, Thordarson, Yaxley, National, Frost, Pilot, Signal, Hammarlund, Clarostat, etc.

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HARTFORD - CONNECTICUT - U.S.A.



Two New Contacts for You

Our Catalog

brings simplified Resistance computing Tables. Write us for it, and ask too for a description of the New HH Contact.

ONE of them is shown above — the new Eyelet Contact that is now a standard part of every HH RESISTOR. It has been universally approved by Electrical and Radio Engineers for its effective reduction of contact resistance through increased, fixed contact areas between wire and terminal.

The other new contact is the one that we welcome come between your organization and ours. We are making RESISTORS for an impressive list of leaders in the industry. There are definite reasons why you should be among them. May we tell you what they are?

 **RESISTORS**
Hardwick, Hindle, Inc.
218 Emmet St. Newark, N. J.

ment adopted in the consideration of questions of policy brought forward by letters to some of the directors from some of their constituents. The members of the Board agreed to undertake the operation of a radio net of their own on the air, the Directors' Chain, and they elected Professor Woodruff as chairman thereof.

The foregoing account is at best an outline of the definite actions taken by the Board. It cannot begin to record the discussions which took place on the many angles not only of these questions but of about every other problem that could be thought of. In addition to their formal meeting the directors inspected the properties of the League, the offices and the headquarters station W1MK, and found time to better their acquaintance with the headquarters personnel and its work.

Somebody recently wished out loud that when Warner wrote up these Board proceedings for QST he would cut out the moralizing, give a bald recountal of the facts, and refrain from "interpreting." We've done our best, but we can't refrain from concluding that it was a good meeting and that it shows that we have a strong and workable system of self-government in our League.

New Two-Volt Tubes

(Continued from page 22)

It will be noted that the mutual conductance of the new tube is about 50% greater than that of its predecessor, with a slight decrease in plate resistance. Greater amplification can therefore be expected from the UX-232 when substituted for the Type '22 without any changes in circuit constants other than those necessitated by the lower filament voltage and a slight increase in the grid bias. When used in present receivers operating from a 6-volt battery, both these changes can be made simultaneously by the insertion of a 50-ohm resistor in the negative leg of the filament, the grid return being made to the battery side of the resistor.

Screen-grid voltage should be obtained from a tap on the "B" battery rather than from a dropping resistor connected between the plate and screen grid. Variations in screen current of individual tubes make this necessary. As with all screen-grid tubes, the screen-grid should be bypassed to ground by a comparatively large condenser.

The new tubes have been designed to be non-microphonic, and therefore should find wide application in automobile receivers and other portable sets. The low filament current and voltage make dry-cell operation entirely practical, although care should be taken to maintain the actual voltage on the filaments at not more than two volts. It is therefore recommended that a filament voltmeter be employed, particularly when dry cells are used.



JUST

THE BEST IS NONE TOO GOOD FOR YOUR TRANS-MITTER — USE THE BEST! A REMINDER — WE STILL HAVE AN AMATEUR LOG BOOK FOR THE HAM WHO DID NOT GET ONE OR THE BEGINNER WHO WANTS TO KNOW, WHATS IT ALL ABOUT, SO SEND IN YOUR OSL CARD OR LETTER. IT HAS A LOT OF GOOD HAM DOPE IN IT THAT YOU CAN USE.

THORDARSON ELECTRIC MANUFACTURING CO.
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REGULATIONS
REQUIRE
ADEQUATELY FILTERED
DIRECT CURRENT POWER SUPPLY!

The best way to comply with these new regulations is to use Tung-Sol Filter Condensers.

1 Mfd. 1000 volts*
\$6.00
2 Mfd. 1000 volts*
\$12.00

OIL DIELECTRIC
BETTER FILTERING
LONGER LIFE

1 Mfd. 2000 volts*
\$12.00
2 Mfd. 2000 volts*
\$24.00
*Working voltage

TUNG-SOL CONDENSERS, INC.

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Formerly Brown & Caine

Condenser Specialists since 1920

FROST-RADIO engineers have banished noise from wire-wound volume controls!

THE necessary use of wire-wound Volume Controls in high gain Radio Receivers has presented fresh problems to the manufacturer of potentiometers and rheostats. Previous standards and methods of manufacture having proved to be wholly inadequate, radically new and different materials and processes were required, and it remained for FROST-RADIO Engineers to develop these.

They have perfected an automatic device for rounding and polishing the contacting edge of the wire. This process so perfectly forms the wire edges that there is not one ten-thousandth of an inch difference in height between any adjacent wires. A velvet smooth contacting surface is thus provided.

They have proven that the new FROST-RADIO Volume Controls will withstand a fatigue test of two hundred thousand half-cycles, at a speed of thirty per minute, without evidence of wear on wire edge or contact arm, and that they are as perfectly noiseless at the completion of test as before being subjected to fatigue.

A complete treatise on the subject of volume controls has been prepared by our research laboratory. We will be glad to send a copy to any interested engineer.

HERBERT H. FROST, INC.
Main Offices and Factory: ELKHART, IND.

A few sample tubes have been tested and found to work very satisfactorily on high frequencies. Thumping the table or even the receiver itself



AN EXPLODED VIEW OF UX-232

failed to set up the usual annoying ringing noises common to most d.c. tubes, particularly those of the '99 Type.

— G. G.

THE A.R.R.L. LOG SHEET

New Regulations Require Station Log

The new amateur station regulations of the Federal Radio Commission, announced in May *QST*, oblige every amateur station to maintain a log of operating activity. Every station ought to keep a log. A.R.R.L. has been preaching it for years. Now it becomes compulsory under the regulations.

A well-kept log gives proof of station transmissions. It is invaluable in checking up the records of your work. Its presence identifies your station as a systematic one. The Government now requires it as a record of transmitting activity.

Being purchased now in large quantities, the price of the Log Sheet has been substantially reduced. The new low prices:

100 sheets	50c
250 sheets	\$1.00
500 sheets	1.75
(Postpaid)	

**THE AMERICAN
RADIO RELAY LEAGUE**
Hartford, Conn., U.S.A.

Naval Reserve Holds Its First National Emergency Drill

(Continued from page 26)

the Naval Reserve will be one of the largest. Aviation and radio are going forward hand in hand and the time has come already when aviation cannot get along without radio. In the future the operations of our surface, air and undersea fleets will become more and more dependent upon radio communication. Those of us who follow the military side of radio are qualifying ourselves for future service in time of need.

New England Division Convention

(Continued from page 38)

GBS. A good description of Aircraft Radio Equipment and the use of Beacons was given by Mr. A. P. Bock of Westinghouse. Mr. A. D. MacLeod, Champion Tube Works, Inc., brought the fellows some useful suggestions on "Telegphony in the Amateur Bands."

The call to the Banquet Hall came at about 6:30 p.m. Close to 225 were in attendance. Entertainment was furnished by an orchestra, and several YL singers and dancers (ask Doc Tessmer, W1UM, about the YL). Director Best officiated as toastmaster and very ably carried out his part of the program. The speakers were President

Vitrohm Stabilizing Resistors

When the plate potential of radio transmitters is supplied by filtering rectified A. C. it is common practice to connect a stabilizing resistor across the output of the plate supply.

The advantages are:

1. Protects the filter condensers from high peak voltages, which lengthens their life.
2. Steadies the note.
3. Tends to eliminate chirps.
4. Discharges condensers when key is open.

Send for circular 507, describing Vitrohm Resistors for radio. It will be sent without charge upon request.

You will find in this circular Vitrohm Resistors to meet every radio requirement.

Output Voltage	Total Resistance	Vitrohm Resistors
250	25,000 ohms	1—Cat. 507-65
550	50,000 ohms	1—Cat. 507-68
1000	50,000 ohms	2—Cat. 507-65 in series
1500	60,000 ohms	3—Cat. 507-5 in series
2000	80,000 ohms	4—Cat. 507-5 in series

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All orders mailed the same day

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Scientifically Prepared for Maximum Power and Unconditionally Guaranteed
1 in. square sections, (within $\frac{1}{2}$ of 1% of your specified frequency),
supplied promptly at the following prices:

75-100 meters	\$12.50
100-200 meters	10.00
200-600 meters	15.00
1 in. Tested blanks, 200-400, 400-600 meters	5.00
Dustproof Bakelite mounts	3.00

(An accurate Calibration furnished with each crystal)
Sections of any practicable dimensions made to order
(Charges for grinding to exact frequencies given on request)

J. T. Rooney, B. Sc., 4 Calumet Bldg., Buffalo, New York
"Fifteen years' crystallographic experience"

"A pioneer crystal grinder."

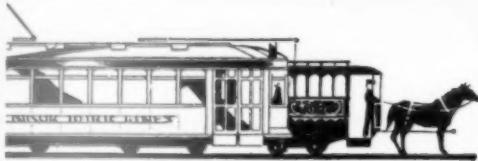


When You Go Calling on Hams Wear Your A.R.R.L. Emblem

A handsome creation in extra-heavy rolled gold and black enamel, $\frac{1}{2}$ " high, supplied in lapel button or pin-back style. The personal emblem has come to be known as the sign of a good amateur. It identifies you—in the radio store, at the radio club, on the street, traveling—you can spot an amateur by it. Wear your emblem, OM, and take your proper place in the radio fraternity. Either style emblem, \$1.00, postpaid.



American Radio Relay League
1711 Park Street, Hartford, Conn.



"Whoa! FLORADORA"

... and being a good ol' mare she threw herself in high whenever traffic became halfway profitable.

The controller box on the modern street car puts Floradora to shame.

In your radio, the control makes all the difference between raucous, crackly noises and smooth, velvety reception.

CENTRALAB performance explains why you will find these volume controls in millions of modern sets.

Write Dept. 320-F for Free Booklet, "Volume Control, Voltage Control and Their Uses"

Centralab

Central Radio Laboratories

Dept. 320 F, Keefe Ave., and Humboldt
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Do You want to be a High Class Radio Operator?

You can be a Clear, Fast Sender, able to work with the best of them. You can be a Rapid, Accurate Receiver, able to copy the fast stuff with pen or typewriter. The Successful Methods used by the fastest and highest paid Radiomen are taught to you in

The Candler System of High-Speed Telegraphing

It is a Post Course of intensive training for developing Receiving and Sending Speed quickly through Scientific Methods (not trick theories). It trains the Brain, Muscles and Nerves to Co-ordinate in doing fast, accurate work. It develops the power of Concentration; gives you Confidence by making you sure of yourself at all times. No matter what your speed now is, we guarantee to increase it.

In big land stations and on ships at sea are successful operators who have taken and are taking the Candler System. "I owe my speed (55 wpm) to your System." — Theo. McElroy, World's Champion. "Can copy fast stuff 3 to 5 words behind easily. Radio-Typing Course is best for radiomen." — Raymond H. Bell, U.S.S. Idaho. Thousands of letters like these pour into our offices from all over the world. There's no substitute for the Candler System of High-Speed Telegraphing.

If you want to get out of the "slow class" and do something, write for further information about this great Course and what it has done for over 45,000 operators. Give your present speed and tell us what you want to accomplish. Also ask about Radio-Typing Course.

The CANDLER SYSTEM CO. Dept. RL.

6343 South Kedzie Avenue Chicago, Illinois

Maxim, Radio Inspector C. C. Kolster, Major Platt, K. B. Warner, A. A. Hebert and E. L. Battey. The call for state and district delegations revealed hams from each New England state and the 2nd, 3rd, 5th and 9th districts. Last, but not least, on the program was the distribution of prizes. Providence was chosen as the seat of next year's convention.

The Worcester Radio Association, under whose auspices this convention was held, did a mighty fine job of it, and they have set a high example to be followed by other committees. Save your pennies for 1931 at Providence!

— E. L. B.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

Glenn G. Austin, W3ARK-W3AMG, Washington, D. C.

J. McRobb, VE2AU, Montreal, P. Q.

Ralph B. Nelson, W6CBN, Alameda, Calif.

H. L. Robinson, VE2BC, Montreal, P. Q.



Correction

The following amendments should be made to "The ABC of Filter Design," April QST.

In Fig. 9, R_o should be 100,000 ohms instead of 50,000.

Page 37, left-hand column:

$$R = \frac{r_p \times R_o}{r_p + R_o} = \frac{2 \times 10^5}{12} = 16666 \text{ ohms.}$$

Therefore Z_t or $Z_\pi = 16666 \text{ ohms.}$

$$L_h = \frac{.0797 \times 16666}{20000} = .066h.$$

$$C_{\mu fd} = \frac{79700}{20000 \times 16666} = .000239 \mu fd.$$

Page 38, left-hand column:

$$C_1(\mu fd) = \frac{(100000 + 110000) \times 10^6}{4 \times 3.14 \times 100000 \times 110000 \times 8350} = .000182 \mu fd.$$

$$C_2(\mu fd) = \frac{100000 \times 10^6}{3.14 \times 110000 \times 10000 \times 8350} = .00346 \mu fd.$$

The equations on page 37 can be changed to give the results directly in microfarads and millihenrys if put in the following form:

$$C_1(\mu fd) = \frac{(f_1 + f_2) \times 10^6}{4 \pi f_1 f_2 2} \quad (5)$$

$$C_2(\mu fd) = \frac{f_1 \times 10^6}{\pi f_2 (f_2 - f_1) Z} \quad (6)$$

$$L_2(mh) = \frac{(f_2 - f_1) Z \times 10^6}{4 \pi f_1 f_2} \quad (7)$$

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Acme has a new line of transformers and chokes — 43 different items. Just drop a card today to the Acme Apparatus Corporation, Cambridge, Mass., Dept. Q-2, ask for Bulletins 110, 111 and 112 and learn all about this new apparatus.



Since vacuum tube transmission began, Acme has been making transformers and choke coils, and everyone remembers the Acme Spark Transformers in the early days.

ACME ~ for transmission

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Scientifically designed and constructed. Unexcelled for quality and output.

TYPE TSD, Two-button type, stretched diaphragm. A truly precision instrument \$60.00

TYPE SHD, Single button. Excellent for ordinary ham or public address work. \$12.50

Write for circulars and full details.

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Send for interesting data and price sheet on Transmission Condensers with working voltages up to 3000 D.C. for use with the following tubes: 203A, 204A, 210, 500W, 851, 852, 860, 865.

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Long Island City New York

Oscillating Quartz Crystals

Guaranteed easy oscillators carefully selected and ground for maximum output

1715-2000 kc	\$15.00
3500-4000 kc	15.00
7000-7300 kc	20.00

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When examining the edges of a crystal for small cracks or chips, the range finder of an ordinary Kodak makes a first-rate microscope. Hold the crystal next to the finder and get your eye as close as possible. The finder has more magnification than a reading glass. — *exW6BOY, W6BZW*

W2AUY recently built a Zepp antenna, and his YL wanted to know what the "ladder" was for!

A band-spreading condenser of the split-stator type can be made quite easily from an old two-gang condenser. This eliminates the difficulty of insulating the two stator portions from each other. — *W2AVS*.

Another newspaper gem: "It takes at least one microphone to by-pass audio-frequency currents and that is what you are trying to get rid of."

A Crosley "Musicone" frame makes a good-looking microphone stand. Three brass springs from the 5-and-10 form the suspension. The three-cornered spider on the frame should be cut out with a hacksaw and the rough edges finished off with a file or hammer. The frames can often be picked up for a nominal sum at a junk shop.

A handy gadget for holding a pick-up lamp during tuning, neutralizing, etc., is a spring clothes-pin. A flashlight lamp socket can be mounted on it, and the loop formed by a piece of wire between the two screws on the socket. By this means the lamps can be readily replaced. The business end of the clothes-pin is of course clamped over the tubing in the inductance. — *R. B. Southworth*.

The tin cans that the old DeForest tubes were packed in make excellent tube shields, according to W9ACC. The screw top serves as a mounting base, and the can can be cut off at the other end to the required length. W9ACC also suggests that the large-size salt shakers (1 to 1 1/2 pints capacity) obtainable at 5- and 10-cent stores can be used in the same way to form coil shields.

We have received some complaints from *QST* advertisers to the effect that they often receive orders from hams who neglect to sign their names or give addresses. Incidentally, this also goes for a lot of fellows who write in to Headquarters. Naturally the recipient of the letters can't be expected to have clairvoyant powers or some sort of divining rod to make the missing dope disclose itself. So be sure to give your name and complete address when writing if you have any hope of receiving an answer. Call-letters are not enough; they change so fast the call-book people have a hard job keeping up with them.

W8JT calls our attention to the fact that the winding form of the 75-watt size Electrad resistor makes a good form for a space-wound r.f. choke. There are 107 grooves on this size.

QST Oscillating Crystals

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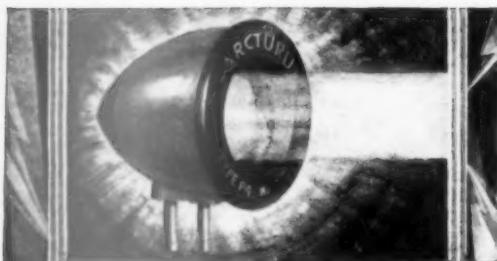
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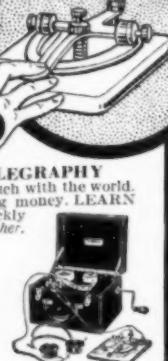
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—W9FGQ

W6BGC suggests that aluminum meat loaf pans, obtainable almost anywhere for about twenty-five cents, are fine for stage shields. The pan is mounted upside-down on an aluminum sheet of the same size.

Charles S. Taylor, 1883-1930

IT is with deep regret that we must chronicle the passing of C. S. Taylor, WSPJ, at Buffalo on March 4th. He was nearly 47 years old. Known as the friend of every amateur in the region, he had been active in amateur radio affairs in the Western New York Section for a number of years. He was Section Communications Manager and Secretary-Treasurer of the Radio Association of Western New York.

He was born in Buffalo, New York, May 18, 1883, his first interest in wireless communication being aroused by attendance at meetings of the Buffalo Wireless Club about 1912. Experimenting with the crude apparatus of the time his "spark" was first heard on the air about 1915. He continued an ardent student of radio until the coming of the war temporarily silenced the amateur.

When the ban was lifted after the war WSPJ again returned to the air. Taylor was prominent in the early development of amateur radiophone in Western New York, coming on the air with 'phone late in 1920. He introduced to the Buffalo Police Department the possibilities of this type of communication. News items were broadcast. All early Buffalo radio fans heard his voice and listened to his entertainments. During 1921 the transmitter was moved to the Elmwood Music Hall in Buffalo. A concert by Geraldine Farrar was broadcast, the first high class broadcast for the vicinity. These early incidents held his interest.

Continuous activity identified Taylor with all developments of amateur radio. In 1926 his activity in the A.R.R.L. field organization resulted in his election as Section Communications Manager of Western New York, a position held and the duties of the office faithfully and carefully executed until his death. He was Secretary-Treasurer of the Radio Association of Western New York for two years and also an active member of the Volunteer Naval Communication Reserve. His key is silent but he will be remembered by all as a real friend.

Physics Lib. JUL 26 1930

QST

DEVOTED ENTIRELY TO

AMATEUR RADIO

PUBLISHED SINCE 1915 BY THE AMERICAN RADIO RELAY LEAGUE INC.



AUGUST, 1930

25^c

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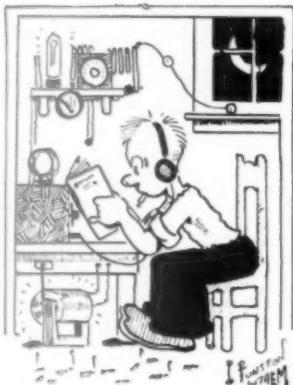
Whether you are a new amateur, wondering where to apply for your licenses, or what the other fellow means when he tells you "QSD"

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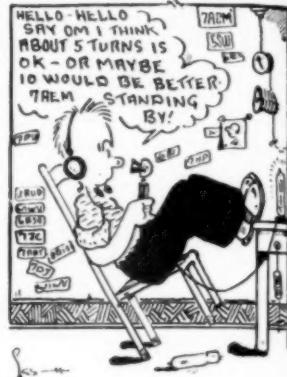
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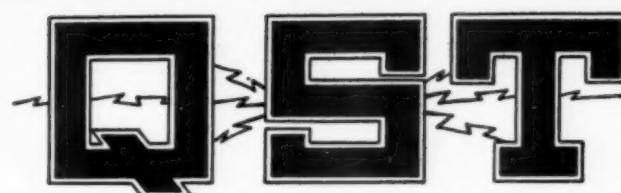
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**AMERICAN RADIO RELAY LEAGUE
HARTFORD, CONN., U. S. A.**





The Official Organ of the A.R.R.L.

VOLUME XIV

AUGUST, 1930

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QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A.
Official Organ of the A.R.R.L. and the International Amateur Radio Union

Kenneth B. Warner (Secretary, A.R.R.L.), Editor-in-Chief and Business Manager

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Circulation Manager

G. Donald Meserve
Advertising Manager

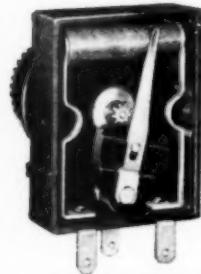
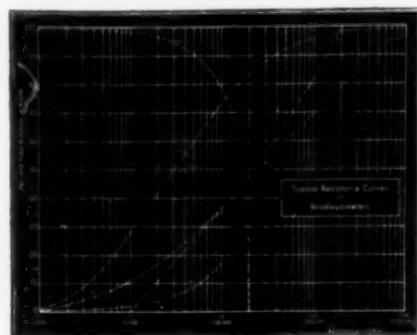
Advertising Offices
Editorial Offices

55 West 42d Street, New York City
1711 Park Street, Hartford

Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, \$2.50 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, \$3.00 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1928.

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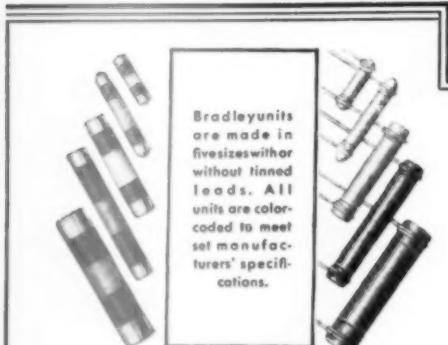
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Type AAA
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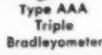
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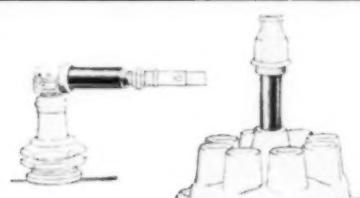


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EDITORIALS

WHEVER our morning mail discloses an envelope with the writing all snarled up because of the frenzy of the writer, we know what it's about before we open it. It's some member writing in to *QST* to give us the devil for publishing some article which he thinks "too technical." Whenever we publish even the simplest algebra we retire to our bomb-proof dugouts for a week after the issue is out. And we know by long experience that if an article isn't A-B-C in style, with complete specifications for building something or other, there are far too many amateurs who won't try to understand it, irrespective of its merits, but who, more or less vocally, are displeased with its very appearance in our pages.

We think that *QST* is an intensely practical magazine; it is famed for the direct help it brings to practicing amateurs. But amateurs should know something about radio, should be able to think some for themselves, should not have always to follow constructional specifications blindly. Partly for these reasons, partly because there are some subjects not yet reduced to successful practice, *QST* also has articles which deal with the theoretical side of things radio, and it is these stories which are so often scorned by the practical amateur. Fortunately, not all amateurs scorn them, and it happens that right now we're able to point to practical benefits from the "too technical" articles that ought to satisfy all hands. For instance, in our July issue there was an article on a better, more efficient and compact chemical rectifier which places the "chem" right up in the front row as a unit in ham plate supplies. It was directly based on Kryter's theoretical article on rectifiers in April of last year. There are important developments on the fire right now in the dynatron frequency meter, soon to appear in *QST*. They are based on an out-and-out "too-technical" article, "The Dynatron," which we published last February. The filter portion of Grammer's rectifier and filter yarn in June is based on Zottu's "too-technical" article which ran in April.

These practical follow-up constructional articles would never have been born without the fertilizing influence of the "too-technical" articles. They may be castor oil to some of us, but they're good for the system. We shouldn't think we're being "gypped" because we don't understand them all. Other amateurs of greater experience will take up these articles and sooner or later bring practical how-many-turns stuff to *QST*'s pages which means an otherwise unattainable advance in amateur technique.

There is increasing indication of a change in the way amateurs go about their developments — the *QST* staff believes that we are in a period of transition in amateur practice, transition from blind experimenting and empiricism to real research. We don't mean research of the pure-physics variety as much as intensely practical research. Surfeited with merely knowing how to assemble apparatus which works well, we amateurs as a group seem now to be starting back over the route to find out what makes our circuits tick. In the process we are finding out a lot of things and again definitely improving our apparatus and technique. The push-pull transmitter described in our June issue was an excellent example of this; the dynatron exploration now under way is another; so are the recent developments in 28-mc. and directive transmission work, requiring as they do a knowledge of pure physics for their intelligent attack. The moral in all this is that the amateur who has thrown his old high-school physics book in the junk-box had better fish it out and read up on electron theory, light, reflection and refraction, and so on — all of which are pertinent to amateur radio of today.

Not that *QST* means thus to announce that it is going in for more and more theory. Far from it, it is simply that fundamental appreciation of what's happening in radio circuits will help every department of a practical amateur's work. *QST*'s articles will always be "of, by and for," because that's our very purpose in life.

We notice, by the bye, that a couple of other magazines are claiming a little too loudly that they have "short waves" by the tail and are the only reliable purveyors of information thereon.

Well, well! Ain't that somethin'!

K. B. W.

Central Division Convention

Dayton, Ohio, August 30th-31st
(Ohio Section)

WHOOPEE! Open sesame! The Central Division Convention is to be held in Dayton, Ohio, Saturday, and Sunday, August 30th and 31st, at the New Biltmore Hotel, under the auspices of the Dayton Amateur Radio Association. While there will be some good technical talks it is the intention of the Committee to give every one 90% good times. It being the desire of the Committee to start things early Saturday it is planned to have something for these who reach Dayton Friday evening. The best of it all fellows is the price — it is only \$3.50. The headliners for this convention are: D. J. Angus, the new Director; K. B. Warner, Secretary and General Manager, and C. C. Rodimon, Managing Editor, *QST*.

A cordial invitation is extended to all amateurs in the Division as well as those in other sections — show up and you will see what we will do for you. Send word to Mr. L. E. Furrow, General Chairman Convention Committee, Post Office Box 76, Dayton, Ohio.

Northwestern Division Convention

August 29th-30th at Spokane, Wash.

ONWARD to Spokane, Wash., fellow amateurs, to attend the annual A.R.R.L. divisional convention to be held Friday and Saturday, August 29th and 30th, at the Hotel Dessert, which is being sponsored by the Radio Operator's Club. Those of you who attended the last convention here three years ago well remember the very fine affair given, and the committee this year feel that the visiting members will be treated to a program far in excess of anything yet attempted. There will be plenty of entertainment and a banquet supreme for the last

night is being arranged for at the "Oasis" in connection with the Dessert Hotel.

We are hoping to have Mr. A. L. Budlong, Assistant Secretary, A.R.R.L., as Headquarter's representative; if not, Fieldman Hebert will be here. We are doing our best to secure Howard F. Mason, of Seattle, who has been with the Byrd Expedition, as our guest of honor. There are many other things in the wind, but we cannot make the announcement at this writing. Rest assured, however, that a cordial reception awaits all delegates. Just drop a line to J. L. Moon, Secretary, W. 3823 Heroy Ave., Spokane, Wash.

Pacific Division Convention

Honolulu, T. H., August 8th-10th
(Hawaii Section)

GREETINGS! The Hawaiian Section of the Pacific Division, through its Section Communications Manager, extends to all amateurs a cordial invitation to attend its first convention to be held in Honolulu on the 8th to the 10th of August. Radio your reservation to L. A. Walworth, SCM, 2737 Ferdinand Ave., Honolulu, T. H.

Strays

Mr. W. D. Terrell, Chief of the Radio Division of the Department of Commerce, has announced the creation by the Secretary of Commerce of the post of Traveling Radio Supervisor and the assignment thereto of Mr. Arthur Batcheller, for many years the Supervisor of Radio at New York.

Mr. Batcheller's new duties are those of an executive liaison officer, coordinating the activities of the twenty field establishments maintained by the Radio Division — the nine district offices, ten sub-offices, and the Grand Island (Nebr.) monitoring station. His successor in the Second District has not been chosen at this writing.

The Story of PMZ

By Harry Wells, W3ZD*

PROBABLY the first thing you fellows would ask if we were all able to get together would be, "How did you happen to get the lucky break" — so let's start off with a football game.

If I hadn't decided to return to Washington from Pittsburgh, where I had been working with the Westinghouse Company, in the fall of 1928 for the homecoming game of the University of Maryland with the University of Virginia, the following events would never have happened; to me anyway.

The day following the game I noticed a news dispatch concerning the All-American Lyric Malaysian Expedition which would go in the near future to Borneo with a small party of scientists for the purpose of making a study of the primitive natives, to obtain geographical data, and also to make observations on tropical and equatorial radio conditions.

Through the medium of the clipping I got in touch with Mr. Theodore Seelmann of Chicago, the leader of the project. It developed that he was looking for someone with certain operating and practical experience as well as technical training, and I was lucky enough to get the appointment.

So, early in 1929 I proceeded with the selection of the various equipment required by our party. In connection with this I wish to offer particular thanks to Dr. J. H. Dellinger of the United States Bureau of Standards and Mr. Lawrence Hyland of the U. S. Naval Research Laboratories, whose timely suggestions were of considerable assistance.

It was considered advisable to have three complete and separate transmitting and receiving units: the first a fairly long-range and semi-portable outfit; the second an emergency transmitter to be used in case of any serious breakdown; and the third the portable job to be used by the advance parties for contact with the base.

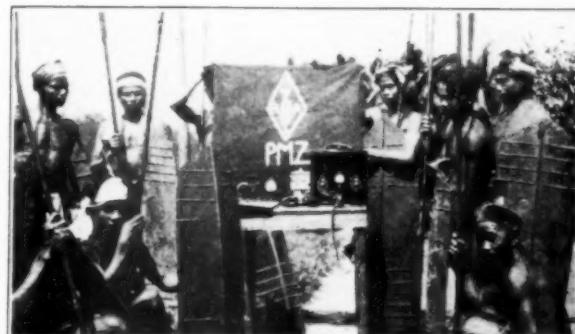
The main transmitter unit was a fifty-watt t.p.t.g. Marine Corps type outfit supplied "in toto" by the firm of Heintz and Kaufman, short-wave radio specialists of San Francisco. Plate and filament currents were supplied from a small duplex 240-cycle generator driven by a single-cylinder two-cycle gasoline engine.¹

This complete equipment, comprising transmitter, gas-engine generator, receiver, telescopic mast and odd parts, weighed less than 200 pounds packed in sturdy canvas containers and could be erected by several men in a very short time.

The emergency transmitter was a bread-board high-C Hartley incorporating a UX-210, the plate supply of which was obtained from a 12-to-350-volt dynamotor. This was built and tested at W3ZD.

Our portable job was a Burgess aircraft type unit comprising two 201-A tubes in a m.o.p.a. circuit with the power supplied entirely from batteries.

Wherever possible, every piece of equipment



PRIMITIVE DYAKS GATHERED AROUND A PORTABLE INSTALLATION ON THE MORUNG RIVER

The natives believed that the radio was white man's magic which persuaded friendly antahs to carry the messages. The banner which two of the Dyaks hold was the official flag of the expedition. It was left at the PMZ Shrine at the headwaters of the Morung River.

was especially sealed or impregnated as an added protection against the disastrous effects of the tropical moisture.

Preparations were completed by the latter part of March and our party of four Americans including Mr. Theodore Seelmann, with Mr. and Mrs. John H. Provinse of the University of Chicago, embarked on April 3 from Seattle. Mrs. Provinse was to accompany her husband as far as Java.

By keeping the strictest personal supervision over the shipping and handling of our equipment we were able to get everything to Borneo without any serious mishaps. Our nearest calamity occurred when a Dutch mate stowed the box containing the storage battery acid upside down in the hold. Luckily, when the mistake was discovered several days later the corks were still holding.

* 219 East Poplar St., San Mateo, Calif.

¹ This set is identical with that used by W6OJ in his African adventure and was described in July QST. — EDITOR.

The voyage outward was made by way of Japan, China, Philippine Islands, the Celebes and Java. After just two months we were to get our first glimpse of Borneo. However, that long awaited moment didn't present a very enticing view. The heat seemed to come rolling out to meet our small coastwise steamer. The shoreline was indefinite and appeared as a rather depressing maze of swamp and jungle.

On our arrival at Bandjermasin, the capitol of Dutch Borneo and a town of 40,000 population,



FIG. 1.—WHERE IT ALL HAPPENED

"PMZ Shrine" marks the journey's end; here was left the official PMZ flag emblazoned with the A.R.R.L. emblem. The arrows indicate approximate great-circle directions to the U. S. A., Manila and Eastern Australia. Captain DeQuant was massacred only an hour's march from PMZ's base at Poerock Tjahoec.

of which only a few hundred are whites, we proceeded with the final preparations for our trip into the interior. There we were also initiated into our first crocodile hunt.

On the boat from Soerabaya to Bandjermasin we had become acquainted with a skin buyer who thrilled us with strange tales of Borneo's huge snakes and wild life and promised to take us with him to places nearby where one could see hundreds of crocodiles in an evening. So one afternoon we packed a large boat with guns, lamps, provisions, and started out. We paddled until dark through the myriads of interconnecting rivers and canals in the vicinity of Bandjermasin, then selected a deserted stretch of river lined only by unbroken jungle as our hunting grounds.

An auto spotlight was connected to a storage battery in the bow. One man took his position there and, as the boat gently drifted through the stillness of the tropical night, cast the light

upon the river banks. Another man, with the sights of his rifle whitened, was stationed immediately behind the light quiet, awaiting the tell-tale bright red reflection of the crocodile's eyes. When one was spotted we would maneuver the boat within range and he would then take a dead bead on the eyes only, for that is the most vulnerable spot. In the course of the evening we saw dozens of crocodiles both large and small, but most of the old boys were a little too smart for our amateurish methods and we were only successful in bagging several of the smaller c ranging from 4 to 7 feet in length.

INTO THE INTERIOR

The trip up the Barito River proved most interesting. At times the progress of the little Dutch river boat, *Negara*, would be almost completely blocked by vast quantities of water hyacinths which would form a solid mass from bank to bank. The strange jungle odors, the bright-hued tropical birds flying overhead, the herds of chattering monkeys playing along the banks, the occasional wild boar or deer seen cautiously quenching its thirst, the crocodiles or snakes gliding through the muddy, sluggish water, all seemed to be crying, "This is the road to adventure and the real things of life."

One week after leaving Bandjermasin our boat pulled into Poerock Tjahoec, the last Dutch military outpost on the Barito, some 250 miles from the coast and directly on the Equator. Here the entire white population, consisting of the post commander, Captain J. C. DeQuant, two young lieutenants and a doctor, turned out to welcome our party to the place which was to be our headquarters for the coming months.

At 3:30 in the afternoon we started unloading equipment. Naturally I was anxious to get PMZ on the air as soon as possible to establish contacts, start getting schedules arranged and also to determine with what sort of conditions we would have to contend. We all dropped everything else and commenced unpacking the radio equipment. By dusk the telescopic mast was erected and the assembly of the rest of the transmitting equipment was well under way.

The unusual burst of activity in that ordinarily quiet and slow-moving community attracted considerable attention among the natives; word rapidly spread that some strange and new white man's wonder was about to be demonstrated. Soon the entire population of the kampung was quietly and expectantly squatting around my network of wires and instruments.

Finally all was ready. The gas engine started on the second spin. The transmitter was roughly tuned to the 7-mc. band. I put on the "cans" and picked up a fair signal through a terrible mess of QRN.

"CQ CQ CQ de W6BYY W6BYY . . . AR."

Ted gave the gas engine a twist and off she

roared. I answered with a long appealing call — the first time on the air for PMZ. (We would soon know what that little outfit would do.) By all that's holy in ham language, W6BYY came right back at us! Those thousands of miles which separated our little group in the heart of wildest Borneo had vanished into the ether. Gentlemen, that was a thrill.

To the brown-skinned natives the gas engine was the greatest curiosity and the news quickly scattered that we were doing wonderful things.

Poeroek Tjahoe had had a contraption which

old make a noise like thunder and revolve like lightning. Whole families travelled for days through the depths of the jungle merely to watch our activities. The radio, of course, was far beyond their comprehension, so they preferred to believe that by means of this apparatus we were able to induce friendly "antohs" or spirits to carry forth our messages.

Our first QSO's were not very satisfactory from an operating point of view because the humid atmosphere affected the carburetion. In spite of all possible adjustments, every time I would shut down the engine to listen in, it would invariably become so badly choked or flooded that when I'd want to come back at the other station it would be necessary first to pull the spark plug and wipe that off before the engine would start. During the intermission the QSO would be lost.

It did not require much foresight to see that if PMZ were ever to be a success on the air this



TED SEELMANN ENTERTAINS A GUEST WITH "LYRIC" MUSIC

Mr. Seelmann is, of course, the gentleman at the left.

condition would have to be corrected. Accordingly as the erection of our base camp progressed, I developed a method of shielding the ignition so that reception could be obtained without any noticeable electrical QRM while the engine continued running at slow speed with the clutch disengaged.

Reliable schedules were soon established with the Philippine Islands and California. The majority of our traffic, such as the daily report to the Chicago offices, was handled through the P. I. stations of Sergeant Paul Holbrook, KA1AF, and Commander S. M. Mathes, KA1CY. Mr. L. R. Potter, W6AKW, and Colonel Clair Foster, W6HM, took most of the messages to be sent direct from PMZ to the U. S. A.

As had been expected, the moisture and static were our chief persecutors. It is interesting that the equipment which has been especially sealed and impregnated held up O. K., but that a



THE SHACK OF PMZ AT NONOKLIWON

It was from here that the contact with W6AKW was made. The gentlemen leaning against the floor are John H. Provinse, of the University of Chicago, and the author (right).

transformer which was exposed for a test developed an open circuit within two weeks.

There were invariably thunderstorms in the vicinity, so several types of so-called "quiet" antennas were tried in attempts to reduce the noise level, but the ancient Beverage type, long and low, was the one which gave by far the best results. This antenna was about 300 feet long, never over eight feet above the earth, and grounded at the far end through a resistance of 200 ohms. The free end was pointed in the general direction of the U. S. A. and gave a decided directional effect.

The transmitter antenna used at the PMZ base was a single wire about 200 feet long and 30 feet high, fed by a quarter-wave "ladder," for 7320-ke. operation. This arrangement put one and a half full waves on the radiator.

After gradually becoming accustomed to the heat and direct rays of the sun, we started plans for our first real exploration trip. The Dutch Government had very courteously offered military assistance whenever possible, so it was agreed to make an attempt to reach the headwaters of the treacherous Murung River — territory never before seen by a white man — while at the same time making a search for the most primitive of natives, the nomadic Punan Dyaks.

Some tests on the portable transmitter showed

that the Philippine Islands could be worked with an adaption of the W3ZD emergency set using one 201-A with 300 volts of batteries at an input of seven and a half watts. It was decided, therefore, that instead of using the portable jobs



A DYAK MEDICINE MAN

He waves the chickens and whatnot over his patient's head to drive away evil spirits.

merely for contact from the field party to the base, we would attempt direct QSO with the P. I. This course was advisable since in the short time available it was impossible to train any other member of the party sufficiently in its operation.

The transmitter, complete with batteries and tray containing wires, tubes and spare parts, was packed in a water-tight metal box. The H. & K. inspector's kit receiver was protected by its stout wooden casing and a heavy canvas bag. The two units comprising our complete transmitting and receiving apparatus weighed some 60 pounds, just making a good load for one coolie.

By the middle of July all was in readiness for the start. Captain J. C. DeQuant, post commander and *controleur* of a portion of Central Borneo larger than all of Holland, was in charge of the party. Seelmann and myself completed the white personnel. Five convicts, who were serving time at Poerok Tjahoe for murder, were assigned to assist in the paddling and do

the cooking. Our Chinese boy, Lim, was no interested in seeing any wilder people. Other natives were secured to help paddle our boat from one kampong to the next. Everything perishable was packed in those five-gallon gasoline tins which are so indispensable in the tropics.

For the first days our two heavily laden boats plowed through rather sluggish muddy water, but on the third day the banks became higher, the water faster and by that evening we were on the edge of the Kiham Hatas, Borneo's longest single rapid — 600 yards of water fury.

The ensuing month was one continual story of man's battle with the elements. There were days of hard paddling — days of roasting in the intense heat; sudden showers would soak us through; then the slightest breeze would chill us to the bone; swarms of insects gave one little rest. Rapids, waterfalls, narrows and whirlpools had to be encountered, where the slightest error in judgment might spell destruction for all.

We were too busy and tired to heed any rumors of unfriendly natives.

At one village we were successful in capturing a Malay trader who had murdered a Dyak only the day before. That night the murderer was chained by the neck to a post in the center of a shack. Our camp beds occupied the other space. The Malay was afraid to sleep on the floor because he thought the Dyaks might spear him from underneath. Personally, I could only think, "Gosh, what if they miss him?" That canvas spread on my bed felt awfully thin. . . . I have passed more restful nights. But evidently the Dyaks were satisfied that we keep the prisoner, for nothing untoward occurred.

Three days later we arrived at Toembang Topus, the last village on the Murung and practically at the headwaters. The next day it was necessary for Captain DeQuant to make an overland journey to another isolated kampong.

Little PMZ portable had been stepping out in good shape. We made set-ups every few days, or whenever conditions were favorable. KA1CY was on the air every evening at six-thirty looking for my little warble, but the sked proved a little early, and several times it was impossible to raise the Philippines until later in the evening. However, results were quite good since QSO's were made from every installation. The transmitting antenna generally consisted of about 100 feet of wire, anchored onto a handy palm tree, current fed with a quarter-wave "counterpoise." A separate aerial was used for the receiver so that a break-in system was possible.

After signing off we'd tune in some short-wave broadcast and let the group of curious natives listen to the white man's magic. The stolid Dyaks would show little surprise on hearing the moaning of a saxophone or the melodies of an orchestra for the first time — mostly amusement and curiosity. To show them that the music was

was no . Other boat everything on gas tropics en boats water, higher, were on longest al story re were in the oak us chill us the little whirlpool st error ll. many ru- pturing ak only er was er of a space, poor be ar him think, canvas I have ly the isoner, mbang d prac- it was ke an pong. out in ays, or A1CY looking a little ble to ening. QSO's trans- but 100 in tree, poise." ever so -wave atives stolid the of an ement he was

being picked from the air I would disconnect the antenna and then put it back, bringing in the signals again. But when I tried to explain that it only required a fraction of a second for the impulses to travel thousands of miles, they gave up and preferred to think that we were powerful beings who controlled kindly spirits to carry out our desires. Toy phonographs also went over big, but some one would invariably try to climb inside the horn to see where that noise was coming from.

I was often bothered by a crowd of natives gathering around the set-up and getting tangled in the wiring or knocking something out of adjustment, so on one occasion I let one of the more troublesome boys feel the terminals of a Burgess PL 108-volt battery. He jumped back yelling "panas" (hot), and after that they were afraid to come within ten feet of the outlay.

The QSO with KA1CY on August 6th was fairly decent and we were able to clear considerable traffic, so we left the outfit under guard and early the next morning Seelmann and I started our dash to the headwaters, while De Quant was away. No white man had heretofore penetrated this territory. With the four of us (counting two Dyaks) paddling steadily our light boat made good time. The water soon became so shallow that it was necessary to wade. Logs and overhanging creepers impeded our progress, but by afternoon we had reached the actual uncharted headwaters. Here a small clearing was cut in the virgin jungle and a shrine erected to the Goddess of Fate who had safely guided us so far. A signed statement was sealed inside a gourd: our home-made PMZ flag bearing the A.R.R.L. emblem was raised, and an old battery and a radio tube were left on the raised platform. Several salutes were fired into the air. The Dyaks seemed deeply impressed by our solemn ritual.

The return to Toembang Topus was managed by nightfall and we had the following message ready: "Reached destination. Starting back tomorrow. Batteries getting low so expect next QSO from base station."

But as it happened the batteries were a little too low — we had already obtained double the expected usage. To make matters worse, Manila was in the throes of a typhoon and the message never got off. The next day we were obliged to start back, having given the dead batteries to the natives as souvenirs.

After a week had elapsed with no word from PMZ, the Manila papers came forth with the stories that we were lost, strayed, and even eaten; and when these reports were reproduced in the American press considerable anxiety was caused. Luckily we reached our base just two days later and notified all that we were safely returned, although slightly the worse for wear.

PMZ took to the jungle on numerous occasions, but to go into detail here might be boring. At one

time our party arrived in a kampong to find the men armed to the teeth with knives, spears, and blow guns. The women and children were cowering in their huts, afraid to venture out of doors. Their report was that an enemy tribe of 200 warriors was hiding in the jungle preparing to



THE "FIRST ASSISTANT OPERATOR" TAKES A TRICK AT THE KEY

The barbaric accoutrement makes an incongruous accompaniment for the white man's modern radio apparatus.

attack and massacre them all. One man had been shot at with a poison dart. However, nothing more happened while we were there, nor did we ever hear any more of these headhunters.

What I believe to be a record for portable transmitters was established on the night of September 14th when Potter of W6AKW copied PMZ's signals from a temporary set-up at Nonokliwon, two days away from the base camp. At the time of Potter's reception I was working VS3AB near Singapore and using a 201-A tube with 300 volts on the plate.

On another occasion with the same W3ZD transmitter PMZ was in direct two-way contact from the base camp with Colonel Clair Foster, W6HM, of Carmel, California.

On the 14-mc. band conditions were quite good for working Australia and New Zealand. The ZL's were raised several times when the portable was using an input of only two and a half watts. The air line distance approaches 4000 miles.

Last year on Queen Wilhelmina's birthday the Resident Governor of Borneo and the Commander in Chief of the Dutch Forces there made a special trip to Poeroek Tjahoe from Bandjermasin as guests of Captain DeQuant. They were all very interested in the progress of our expedition and were out to our camp one evening for "chow" after which they listened to some short-wave broadcasting. They were quite surprised to learn that such small transmitting equipment



THE COMPLETE OUTFIT UNLOADED ON THE BEACH

could furnish direct contact with America. When it came time for the sked with "CF" of W6HM I told him that we were entertaining the "royalty," so Colonel Foster very thoughtfully sent them a message of greeting from the radio amateurs of America which was greatly prized. The evening was quite a success.

Some time later when Captain DeQuant was so brutally murdered only one hour from the base, amateur radio again came to the fore and performed invaluable service for our party and the Dutch Colonial Government. The quickest possible time in which word of the tragedy could have been sent to the coast by boat and an answer received would have been two weeks. In the event of a serious uprising the whole place could have been wiped out in the meantime. But on Christmas eve at six o'clock PMZ gave the first message for the Dutch authorities in Bandjermasin to KA1AF of Fort Mills, who immediately relayed it to KA1CY of Manila. Mathes rushed it to a cable office, so that the message reached its destination on the very night of the disaster.

Replies were cabled to KA1AF, who shot them on through to us.

Considerable official government traffic was handled, saving several months' time and suspense for all concerned, and possibly averting what might have developed into a serious uprising. The work was appreciated immensely and the Colonial Government has very sincerely thanked all the parties concerned.

A short time after conditions had returned to normal, our expedition activities were completed and PMZ said good-bye to its numerous friends of the air. It was with a rather sad feeling that I shut down the little gas engine for the last

time knowing that she would never again disturb the ether of Central Dutch Borneo.

In the June issue of *QST* a letter from Te Seelmann was published expressing our intense appreciation of the hearty coöperation given our party by the members of the American Radio Relay League and I shall not attempt to add more.

Amateur radio, like many other finer things of life, is not always duly appreciated in one's daily routine. Not until you can stand off at the far ends of the earth and view the coöordinated workings of every little cog is one likely to realize fully what a wonderful and staunch machine it is, carrying us all forward into the realms of science and adventure.

Midwest Division Convention

Topeka, Kansas, Sept. 6-7
(Kansas Section)

ALL aboard for Topeka, Kansas, where the Kaw Valley Radio Club is sponsoring the annual convention of this Division. Something new is being tried this year — the Convention will be held on Saturday and Sunday, September 6th and 7th. The Chamber of Commerce is the headquarters for the convention. Registration will take place Saturday morning and the big official banquet is scheduled for early afternoon Sunday. A.R.R.L. Headquarters have promised a representative, but as this announcement is being written it is still undecided as to whom it shall be; it may be A. L. Budlong, Assistant Secretary or A. A. Hebert, Fieldman.

We will have some good technical talks, plenty of good stunts, visits to interesting places and a general all around good time is planned for the delegates. We will do our best, but after all the success of the convention will depend on your attendance. Come!

Please don't forget to write to Frank K. Tifany, Secretary, Kaw Valley Radio Club, 919 King St., Topeka, Kans.

Strays

The signal strength with the popular 4-tube receiver (described in November, 1928, *QST*, and in the *Handbook*) can be greatly increased, according to W9FPD, by substituting a tuned circuit for the antenna coupling resistor. W9FPD uses a $2\frac{3}{4}$ " diameter coil of 5 turns of No. 18 wire, tuned by a $250-\mu\text{fd}$. condenser, this combination covering both the 7000- and 14,000-ke. bands. Tuning is not critical, since the antenna is directly coupled. The size of the antenna will influence somewhat the amount of inductance and capacity required.

Dummy Antennas

By Guy C. Omer, Jr.*

ONE of the greatest problems now confronting the amateur is that of interference. The Technical Development program has made possible stable transmitters; taking up but little space in our crowded spectrum, but a necessary feature in obtaining operating stability is the careful adjustment of the transmitter under load, with constant monitoring. The load employed in about 99 cases out of 100, however, happens to be the most logical one, the regular antenna system. The interference caused thereby is of serious proportions. Moreover, the widely prevalent practice of warming up the transmitter under load and of experimenting with different arrangements, also with transmitter loaded, contribute their full share to the present day QRM. Although the method in general is highly commendable, the load employed should be a *non-radiating* one — in other words, a dummy antenna.

Besides effecting a great saving in the wear and tear on the vocabulary of the fraternity, the dummy has other uses. As long as your transmitter doesn't radiate, you are bound by no regulations. So if you wish to see how your transmitter will behave at such and such a frequency without the amateur fold or if you wish to test out that 'phone with a phonograph record — reach for your dummy!

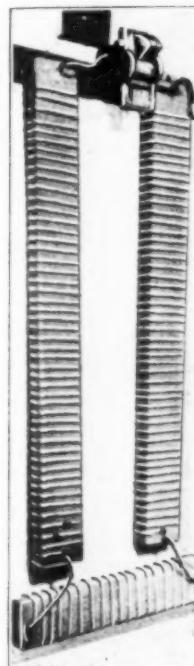
HOW A DUMMY ANTENNA WORKS

All right, now let's see what makes the wheels go around. As far as the transmitter is concerned, the antenna system is nothing but a closed circuit containing reactance and resistance. When the antenna system is in resonance with the tank, the reactance is close to zero and the resistance is mainly "radiation." Now, if we replace the antenna system with a closed circuit containing very nearly the same values of reactance and resistance, the transmitter will continue to oscillate merrily on, all unsuspecting. No fellows, the idea is not new — it's as old as radio.

PRACTICAL TYPES

W9EBF-W9FSC is a 15-watt station operating on a frequency of 3700 kc. using the 150-foot high KMMJ antenna at its fifth harmonic. At its fifth harmonic, this antenna has a resistance of approximately 275 ohms. The dummy used here is about the simplest possible, since the resistance also doubles as the inductance. This combination inductance-resistance is wound with about 60 feet of steel wire, which was used because it was

handy. It is mechanically strong, has fairly high resistivity and fair permeability. The latter factor helps along the skin effect, thereby adding to the radio frequency resistance. One dime procured twice as much wire as was needed.



THE DUMMY ANTENNA MOUNTED ON THE WALL OF THE SHACK

Iron wire wound on strips of wood furnishes the necessary inductance and resistance.

The steel wire is wound on three soft-wood forms of a cross section measuring about $5/6$ " by 2". Two of these forms are 20" long and have windings of 50 turns apiece and the third form is 9" in length and has a 20-turn winding. The amount of resistance cut into circuit is readily variable by a clip. The correct resistance was found by trial and error and these values will not fit your dummy.

An old 250- μ fd. variable condenser was dug out of the junk box and, with the resistance, was fastened to the wall behind the transmitter. The schematic of the dummy, what there is of it, is given in Fig. 1.

When putting the dummy into service, it is first adjusted to duplicate the characteristics of

* W9EBF-W9FSC, KMMJ, Clay Center, Neb.

the regular antenna system. Tune up your transmitter on normal frequency under normal conditions. Note the values of plate and antenna currents and record them. Now, leave all other adjustments alone and substitute the dummy for

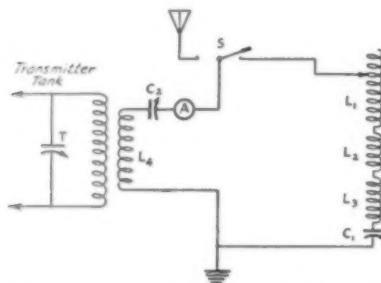


FIG. 1.—DUMMY ANTENNA CIRCUIT

L₁—Dummy-antenna inductance-resistance, 50 turns.
L₂—Dummy-antenna inductance-resistance, 20 turns.
L₃—Dummy-antenna inductance-resistance, 50 turns.
C₁—Dummy-antenna tuning condenser, 250 μ fd.
S—Change-over switch.
L₄—Antenna coupling inductance.
C₂—Antenna series condenser.

the regular antenna system. Tune the dummy to resonance with the tank and cut enough resistance into circuit so that the same plate current flows as previously and the same current flows through the dummy as flowed into the antenna. When making this adjustment, better take steps to protect your antenna current meter because heavy currents may flow in the dummy before you get the right amount of resistance cut into the circuit. Retune the dummy, of course, after each change of resistance since it also acts as an inductance.

Now the dummy duplicates the regular antenna system for the frequency and any warming up or tuning you wish to do may be done with perfect silence for the ham in the next block. I tune up my transmitter to my dummy, but check the resonance of the antenna with the tank while sending the first "ka" because the dummy has considerable d.c. resistance and it therefore has a broader resonance peak than the antenna. The dummy duplicates the regular antenna only for frequencies close to the one tuned up to. At other frequencies (for an exact duplication) retune the dummy.

The resistance should be readily variable since the resistance of an antenna system varies with frequency changes. The fundamental of the dummy does not have to resonate with the tank and harmonics can be used just as easily. Therefore, the values of inductance and capacity are rather unimportant. If the fundamental of the dummy is in the 1715- to 2000-ke. band (or lower) it can be used in all amateur bands, making a very flexible system.

For the amateur who wants a better dummy,

the inductance, capacity, and resistance should be separate. The resistance wire should be wound non-inductively. A non-inductive winding may be made by doubling the wire and winding it on a form, taking care that the turns do not short. The field of one half of the wire cancels the field of the other half with this type of winding. The tuning up of this type of dummy is similar to the method given previously but is much simplified, since the dummy is brought into resonance with the tank and left alone while the resistance is varied until the correct value is arrived at. It would be best to check for resonance after this, however, because the resistance may have a slight effect on the tuned circuit.

In stations using a feeder line to couple the antenna to the tank, the dummy would be coupled best, directly to the tank. In some commercial installations, a feeder line is used to couple the dummy to the tank to more closely duplicate actual operating conditions, but this is a useless expenditure for the average amateur.

The resistance may be wound with any wire—nickrome, iron, German silver, or anything on hand that will work. The resistance may be any size or shape—it only must be able to dissipate the power. It may be home-made or obtained ready made. Western Electric uses the Ohm-Spun resistors for dummies. In one of the R.C.A. dummies, a water cooled resistor is used and to determine the output of the transmitter, the rate of flow and the rise in temperature of the cooling water are measured!

MONITORING

Monitoring is simple and straightforward. The regular monitor is used in the usual way except that it should pick up the signal from the

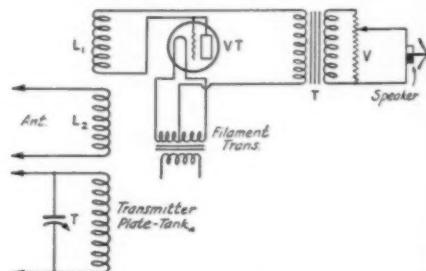


FIG. 2.—CIRCUIT OF THE OUTPUT MONITOR

L₁—Monitor pick-up coil.
L₂—Antenna coupling inductance.
VT—Monitor rectifier tube.
T—Output transformer.
V—Volume control.

dummy and not from the tank. For average power, bringing the monitor into proximity with the dummy probably will prove sufficient. For lower power a closer coupling may be obtained by a single wire, one end in the neighborhood of the

(Continued on page 35)

The Third International Relay Competition

By E. L. Battey, Assistant Communications Manager

WHOOPS!! Now it comes out! The various committees which have been working on the Third International Relay Competition have at last completed their work and turned in their reports. And the reports surely are eye-openers!

The task of checking over the logs fell to the lot of the Award Committee. Those certificates were too good to distribute carelessly, so the committee labored carefully, spending many days going over the reports to see if all rules had been complied with, and that was some piece of work! It was a ticklish undertaking, too. When a fellow has put in a lot of time and worked hard, it is mighty disheartening to him to find, when the scores are presented, that he has not as large a total as he submitted. Some of the participants will not recognize their scores. Some are greater than submitted; some are smaller, due to infraction and misapprehension of the rules, but a contest is not a contest unless rules are enforced, and we ask every one to bear with the verdicts of the Committee. We won't bore you with a review of the rules here. Just dig out your December (1929) issue of *QST* wherein all requirements are stipulated, and note the many points that had to be considered in "checking and double checking."

We know that every one wants to know who

None other than W1ASF, the "old reliable" of international tests. He has a total of 2925. Not a bit bad for a one-man station! "Windy," W8GZ, gave the gang a fast race to the tune of 2435! W6AAZ ran up to 2180. The sixth and seventh high are W4FT and W2FP with 1600 and 1495 respectively! Seven is a lucky number so we will stop there and list below the twenty-five highest scoring stations in the United States and Canada.

THE TWENTY-FIVE HIGH STATIONS

W6BAX, 3210; W4FT, 1600; W9DEF, 1420; W8DJV, 1140; W1AZE, 1065; W2CXL, 2945; W2FP, 1495; W7BE, 1368; W8AXA, 1112; W1SZ, 1060; W1ASF, 2925; W9UM, 1476; W7MO, 1308; W3DH, 1104; W6BSN, 976; W8GZ, 2435; W9ECZ, 1440; W6BZD, 1260; W6EPZ, 1092; W8CCW, 915; W6AAZ, 2180; W1CMX, 1430; W9YC, 1236; W9DGZ, 1068; VE2CA, 856.

There are some mighty impressive scores in that list! It is particularly interesting to note that the high stations are well distributed throughout the country. This leads us to believe that the system of weighted credits, which was tested out in this contest, is somewhere near what we are looking for. But after all this was not a contest between stations throughout the entire country. It was, rather, a competition between the stations in each A.R.R.L. section of the United States and Canada, and between the stations in each foreign country and outlying district where the intermediates "W" and "VE" are not used. A station on the east coast was not trying to out-do one on the west coast but was trying to defeat all other stations in its particular A.R.R.L. section. Certificates will go to the leading foreign-contact station in each section and to the highest scoring station in each foreign locality. A complete list of final scores is given at the close of this article.

Now, what about the foreign participants' scores? CM8UF not only

leads the stations outside of the United States and Canada, but also has a score higher than any United States or Canadian station! The score is 3564!! Zowie! CM8UF exchanged messages with 98 stations in the nine United States districts and with 4 stations in three Canadian government inspection districts. HC1FG would have beaten CM8UF's record had VE9AL counted as another district, but Canadian



won and who has the largest score, so we won't keep you guessing any longer. Here goes — it's probably a case of "he who lost the most sleep ran up the highest score." W6BAX heads the list with a total of 3210 points made by work with five continents. What a score! W2CXL comes next with 2945, having worked 83 stations in five continents. Incidentally, no station succeeded in working the six continents. And who is third?

"9" stations count for the district in which they are located. In VE9AL's case this is the second Canadian district. As it is, however, HC1FG's score is a humdinger—3510—a score any station owner should feel proud of. HC1FG contacted more districts than any other station—9 United States and 4 Canadian. A well-known Porto Rican comes third—K4KD with 3300 points! A total of 3278 gives X9A fourth place. ZL2AC has 2981, and here is G5BY with 2552!! We wonder what would happen if G5BY wasn't found with the leaders? There are twenty-nine countries represented in the list of scores following the United States-Canada totals.



MR. VASCO ABREU SEATED AT HIS STATION PYIAW

Before we go on, let's see what we can find in some of the letters received from participants. The first and foremost cry is, "I had a whale of a time in the tests. When are the next ones?" or words to that effect. Let us consider the United States and Canadian comments by districts. First district: W1ASF found 14 mc. to be the best frequency. European and South American signals came through very poorly. Australian and New Zealand contacts were plentiful. W1AFD says, "Only the very high powered stations came through." W1RY found many foreigners who didn't understand about the tests. Second district: W2CXL reported the off-frequency "W" stations more prevalent than in the tests two years ago. More about that later! Third district: From the number of "W" stations answering his "CQ test message" calls, W3AIY was led to believe that many United States hams have recently come in from foreign countries. Hi. W3ATJ heard many stations which ordinarily use d.e. using raw a.c. during the tests. He started to list the stations heard out-of-band, but had to give up as it left him no time to operate. Fourth district: Oceania appears to be the easiest continent worked in this district. Fifth district: W5WW had his troubles with a power leak, R5-6 in strength, which was on constantly from February 22nd to

28th. Sixth district: W6BAX contacted all continents except Africa on the first day of the tests. European signals were very weak. W6CUH reports 7000 kc. was FB and 14,000 kc. very poor. W6CTP had a good time with one Type '12A. W6BYH blew a couple of fifties during the excitement. Seventh district: W7DP lost several good foreign QSOs due to broad a.c. signals of United States stations. He says that weather conditions were not the best; 14 mc. was absolutely N.G. after 7:30 p.m. W7ACD, the only Idaho station submitting a score, used a single Type '10. W7AHX found a scarcity of foreigners on 7 mc. Eighth district: W8BYN says, "Bad weather and QRM." W8DED did not hear as many foreigners as in the previous tests. Ninth district: W9AUH bewails the number of stations using raw a.c. on 14,000 kc. W9AJA has some interesting comments, which we quote: "On the two week-ends that the station was on the air for European and African contacts, perhaps the outstanding feature was the absence of signals from those localities, and the terrific QRM from the east coast. . . . A significant proof of the fact that foreign stations rarely answer American CQs is shown in the list of QSOs from this station during the tests, as every station that was worked from here was raised by first listening and finding the foreign station. . . . More intelligent use of the receiver and less use of the transmitter will result in more foreign cards on the station wall." Canadian second district: VE2CA and VE2AC report conditions very poor during the contest. Europeans were almost entirely absent. Only five South Americans and no Asian and African stations were heard. Australian stations were numerous but weak. QRN was very bad. They also mention the raw a.c. notes on 14,000 kc. VE2AC says, "I appreciated the general patience



HAF8B

and good humor of my foreign QSO parties in answering my numerous calls for repetitions and fill-ins. These fellows were real sports." Canadian fifth district: Northern lights bothered VE5AW. The first six days of the tests he did not hear a signal.

Now let us look over the comments from for-

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sign participants. Activity was highest in Australia and New Zealand. From ZL2AC: "We all had a very enjoyable time and met many an old friend during the course of these tests." ZL1FC did some fine work with 50 watts input to four type 'O1As in push-pull. VK4DO says QRM was the worst factor to contend with during the tests, and that during the first week "W" stations were not at all strong. VK3JK says, "The lesson of these tests is that a pure d.c., steady note will let a lot more of us work together in the band at the same time." Several participants complained that many "W" stations did not have test messages. According to VK2NS, the best United States signals came from W2CXL, with W8GZ second best. The 14-mc. band was found rather unsatisfactory by the VK and ZL stations. Conditions in Great Britain were very poor all during the contest. G5BY says this was especially true on 7 mc. G6LK was unable to contact any "W" stations on 14 mc. because of adverse conditions. G2GM states that only the high-powered stations came through with any consistency. CT2AA found it extremely difficult to get reply messages off. ON4BC found DX conditions good. HAF8B was troubled by very strong, broadly tuned western Europe stations, and by QRN. HAF3C tells us that United States signals came through very well but stations in Hungary had a hard time reaching America. OZ7Y says that February is a bad month for Denmark-United States contact, and that consequently he was unable to exchange many messages. South American participants didn't give us any dope on conditions there, but we should judge from scores that they were quite favorable. Conditions in China, except for QRM, were very good. VS6AH says, "The 'W' stations came in at good strength, the reports given by this station averaging R7, QSA5. Crystal control stations, even when R3 or less, 'scored all along the line' for ease of message exchange."

We should like to go on now and list the scores, but there is something else we must consider first, something which will probably leave a bitter taste in the mouth of some participants. We are speaking of the report of the Irregularities Committee. After all that has been said in *QST* during the past year, after all the advice and warnings that have been given, there is very little excuse, if any, for off-frequency operation. And yet, 42 participants in the tests were logged out-of-bounds! Sufficient evidence was presented to the Committee to disqualify *fourteen* of this number!! While each case of off-frequency operation was considered separately and on its own merits, a single observer's word never constituted sufficient evidence to warrant disqualification. The one

exception to this rule was in the case of observations made by a member of the headquarters staff. Inasmuch as the unquestionable accuracy of his reports was known, a single off-frequency report made by him meant "disqualification." W5ANA, W6CNX, W8DED, W9AZY, W9BEU and VE5AW would have each received the certificate for their section had they been more careful in staying within the amateur channels. The other stations disqualified for off-frequency operation, although having scores too low to receive certificates, are: W2AYJ, W2UK, W2AEY, W5AQY, W6EAK, W6DPJ, W7EK and K4AAN. There are several other irregularities to consider in addition to the off-frequency cases. One amateur was disqualified on two counts—not only was he working outside the bands, but



X9A, ONE OF THE PIONEER MEXICAN STATIONS

he also was using another man's call while waiting renewal of his license! Definite closing dates were set in the rules for the receipt of reports. Six reports, from W2CUQ, W3AAZ, W6BUX, W9BQE, KA1CE and VK3RJ, were received late and in accordance with the rules were returned to the senders, automatically cancelling their entries. W6AKW, W9DKK and W9DQN cannot be given scores as they did not present all the information required in the rules. W6AME can be given no credit as his messages were handled after 7 p.m. E.S.T. on February 28th. A number of stations, while not actually taking part in the contest, submitted logs so that participants would get credit. We are listing their scores with the rest, marking them with an asterisk to set them apart from those that are actually entered. W6CSJ and W7AAR would be in this group had they not been caught off-frequency.

Several members of the HQs staff entered the tests. W1SZ would take the certificate for Connecticut, if HQs men were eligible for prizes.

Just a few facts and then on to the score sheet: Of 160 United States and Canadian stations whose scores are given below, 57 worked on 14 mc., 32 hammered away on 7 mc., and the remaining 71 divided their time on those two



frequencies. 7 mc. was the popular band in Australia and New Zealand. Throughout the other countries it seems to be more or less of a toss-up between 7 and 14 mc., with, perhaps, a slight leaning toward 14 mc. Of the "W" and "VE" stations, 17 succeeded in contacting five continents; 44 worked four continents; 42 worked three; 36 worked two; and 21 worked one continent only. The leading stations so far as number of contacts is concerned are W2CXL in the United States and Canada, and CM8UF in the foreign group. W2CXL exchanged messages with 83 stations and CM8UF with 102.

SCORES

THE THIRD INTERNATIONAL RELAY COMPETITION

Asterisks denote stations reporting but not entered in contest.

E. Massachusetts		W. Massachusetts		Rhode Island		N. Y. C.-L. I.		W. Massachusetts		W. Connecticut		N. H.		E. New York		W. New England	
W1ASF	2925	W1WV	256	W1BIL	351	W1AVD	12	W2AVO	96	W1ACH	9	W2CJX	70	W2FL	66	W2BPY	30
W1CMX	1430	W1ABG	243	W1ZA	236	W2FL		W2AAW	6	W1AZE	1065	W2AUX*	6	W2BDA	36	W2AEB	3
W1AZE	1065	W1VS	200	W1ZB	6	W2BPY		W2BUY*		W1BHM	117	W2BCB		W2BCB		W2BCB	
W1BKR	832	W1KH	160	W1AFD	78	W2RD		W2RD		W1COW*	42	W2BYS		W2BYS		W2BYS	
W1CPB	360	W1IA	90	W1BFT	58	W2BAI		W2BAI		W1COW*		W2AJP		W2AJP		W2AJP	
WIRY	333	W1MP	48	W1COW*	42	W3CC*		W3CC*		W1JC	18	W2AQG		W2AQG		W2AQG	
		W1TL	18	W2CXL	2945	W2AKD*		W2AKD*		W2CXL		W2BDA		W2BDA		W2BDA	
				W2FP	1495	W2BYP*		W2BYP*		W2FP		W2BCB		W2BCB		W2BCB	
				W2AI	552	So. New Jersey		So. New Jersey		W2AI		W3ACX		W3ACX		W3ACX	
				W2AOG	264	W3DH		W3DH		W2AOG		W3UT		W3UT		W3UT	
				W2ADP	216	W3ACX		W3ACX		W2ADP		W3UT		W3UT		W3UT	
				W2JC	96	W3UT		W3UT		W2JC							

W3ATJ	126	W6CXW*	6	So. Minnesota	322
W3PF	66	W6ETJ*	6	W9YC	322
W3ADH	30			W9DMA	64
		<i>East Bay</i>			
		W6DWI	228	Kentucky	
				W9ELL	1424
		<i>Oregon</i>		W9AUH	135
		W7BE	1368	W9CIS	
		W7MO	1308		
		W7AC	690	<i>Missouri</i>	
		W7AHX	360	W9BMU	171
		W7PV	60		
		W7DP	12	<i>Iowa</i>	
				W9AZZ	1320
		<i>Washington</i>			
		W7NR	351	<i>No. Minnesota</i>	
		W7ACY	99	W9CTW	1305
		W7NM	18		
				<i>No. Dakota</i>	
		<i>Idaho</i>		W9DGS	1254
		W7ACD	138		1080
				<i>Wisconsin</i>	
		<i>Ohio</i>		W9ASL	1060
		W8GZ	2435		
		W8DJV	1140	<i>Maritime</i>	
		W8BKP	805	VE1BR*	504
		W8CFW	595		
		W8BYN	508	<i>Quebec</i>	
		W8DGP	500	VE2CA	480
		W8DDK	46	VE2AC	392
		W8KCN	44		
		W8NRP	32	<i>Ontario</i>	
		W8EZ	6	VE3BK	264
				VE3DA	240
		<i>W. New York</i>			
		W8AXA	1112	<i>Alberta</i>	
		W8ADG	540	VE4GD	138
		W8DME	144		
		W8DUB	138	<i>FOREIGN SCORES</i>	
		W8CVJ	110		
		W8BAI	70	<i>Cuba</i>	
				CMSUF	116
		<i>No. Texas</i>			
		W8CCW	915	K6ALM	940
		W8AJN	504	K6EVW	530
		W8OFG	464	K6ACW	100
		W8SPR	304	K6BHL	51
		W8CRA	96	K6ERH	40
		W8DLG	32		
				<i>Ecuador</i>	
		<i>Michigan</i>		HC1FG	395
		W8DYK	243	HC1LC	351
		W8BNT	104	HC1DR	27
		W8CED	66		
				<i>Porto Rico</i>	
		<i>West Virginia</i>		K4KD	3300
		W8DPO	240	K4AKV	330
				<i>Argentina</i>	
		<i>Indiana</i>		LU3FA	330
		W9UML	1476		
		W9EF	712	<i>Mexico</i>	
		W9AJA	624	X9A	3278
		W9EXW	552		
		W9EMR	42	<i>Portugal</i>	
				CT1BX	180
		<i>Illinois</i>		<i>Hawaii</i>	
		W9ECZ	1440	CMSUF	940
		W9DGZ	1068	K6EVW	530
		W9CPH	804	K6ACW	100
		W9CF	536	K6BHL	51
		W9DCK	312	K6ERH	40
		W9FDJ	129		
		W9AVP	9	<i>Azores</i>	
		W9FMR	6	CT2AA	395
		W9DWA*	8	<i>Portugal</i>	
				K4AKV	330
		<i>Kansas</i>		<i>Argentina</i>	
		W9DEF	1420	LU3FA	330
		W9GDJ	405		
		W9BPL	207	<i>Portugal</i>	
				CT1BX	180
		<i>Illinois</i>		<i>China</i>	
		W9ECZ	1440	VE6AH	114
		W9DGZ	1068	AC1BD	46
		W9CPH	804	AC1TS	1
		W9CF	536		
		W9DCK	312	<i>South Africa</i>	
		W9FDJ	129	ZS2N	100
		W9AVP	9	ZS4E	18
		W9FMR	6	ZU6W	1
		W9DWA*	8	ZU1D	1
				ZS4A	1
		<i>Kansas</i>		<i>Uruguay</i>	
		W9DEF	1420	CX1FB	96
		W9GDJ	405		
		W9BPL	207	<i>Hungary</i>	
				HAFSB	95
		<i>Kansas</i>		HAF3C	1
		W9DEF	1420		
		W9GDJ	405	<i>Brazil</i>	
		W9BPL	207	PY1AW	75
		<i>Kansas</i>		<i>Chile</i>	
		W9DEF	1420	CE7AA	75
		W9GDJ	405		
		W9BPL	207	<i>Chile</i>	
				(Continued on page 80)	

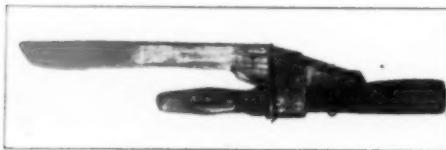
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SAY, SON-



get the gang together, have them pipe down, get their heels together, look me in the eye, and I'll spin a yarn that's never been told. Kitty, make fast over to leeward and close aboard — my aim isn't what it was.

On the wall at A.R.R.L. Headquarters, over the Secretary's desk, in a glass-covered case, since the days of Tuska, lies the Wouff-Hong. It



THE ORIGINAL AND SACRED WOUFF-HONG which hangs at A.R.R.L. Headquarters where, by order of the Board of Directors, the Secretary guards it with his life.

is a fearful and wonderful instrument of torture. It is old and worn smooth from years and years of use. Every ham in radio, old or young, stands in awe of it. Since the beginning of amateur radio it has meant "The one or the other" — either law and order or the Wouff-Hong, take your choice. Have a squint at the illustration.

On the wall, at the United States Naval Academy, at Annapolis, Maryland, in the historic auditorium, since the early days of a previous century, hangs a blue silk flag. On it appear, badly faded, an olive branch, a fearful and wonderful instrument of torture and an inscription. Take a squint at the illustration of this historic old flag and read the inscription. It says those same words, "The one or the other."

In the long ago there lived some especially offensive dark-skinned whops on the southerly shore of the Mediterranean. They used to make a business of stopping every merchantman that passed and collecting a wad of gold or capturing the ship and putting the crew and passengers into slavery. They were known as the Barbary Pirates. For centuries they worked this graft.

In the early days of our country there was a United States naval officer named Stephen Decatur. Steve was a double-fisted double-distilled hellion. The Navy in those days was mostly

hellions, whether ashore or afloat, having just finished off the British Navy in the unpleasantness of 1812. It was Stephen Decatur who put into immortal words the thought that appeals to every properly-built male American. Looking up at the Stars and Stripes he said, "My Country — may she ever be right, but right or wrong, my country!" It's that kind of stuff they put into a man at the Naval Academy and it's the same stuff that has made these United States of America what we are to-day. Stephen Decatur came from the U. S. Naval Academy and he had soaked up a lot of it. Well, after some American ships and American citizens had been seized by the Barbary Pirates, the Navy Department assigned a squadron to Decatur and told him to go the limit.

Decatur shoved off and decided to go to the mat on the matter at once. He picked up a couple



Courtesy U. S. Naval Academy
FLAG FLOWN A CENTURY AGO BY COMMODORE STEPHEN DECATUR

Whatever the nature of the awful implement, the intent of the flag is clear: a choice between good behavior and sudden death. For the information of the curious, it seems probable that the gadget is a garrote, a gentle instrument used for twisting a rope around the victim's neck and so causing strangulation. Careful inspection of the Wouff-Hong shows that it would lend itself admirably to such an enterprise, and that is probably as good a method as any of applying its beneficial properties to wrongdoers in amateur radio. For instance, off-frequency operation. — Ed.

of pirates off Algeria, shot up the whole works, killed the admiral of the Algerian navy, took

(Continued on page 80)

The Operating Characteristics of Vacuum Tube Detectors

A Graphical Study of Grid and Plate Detection for Triode and Screen-Grid Tubes In Two Parts—Part I

By H. A. Robinson, W3LW*

Here is an intensely practical article that does more to explain how our detectors perform than anything we have previously published in QST. The graphical data it contains make possible the intelligent choice of the type of detector tube and type of detection to meet almost any requirement.

This first part of the article covers grid and plate detection (including power detection) with the three-element tube. The second part, which will appear in the September issue of QST, deals with the same considerations for the screen-grid tube and ends with a graphical comparison of the two types of tubes for both grid and plate detection. An appendix of mathematical computations will complete Part II. However, no knowledge of mathematics beyond simple arithmetic is necessary for the complete understanding of the main part of the article. — EDITOR.

IT is the purpose of this paper to present to the average amateur radio operator, in terms which are within his grasp, the general fundamental principles underlying the operation of vacuum tube detectors. The effects of varying detector characteristics and

detector tubes, Type '27 and Type '24 being specific examples of these two classes of tubes. It is hoped that a better understanding of the operating characteristics of detectors, together with a knowledge of the desirable circuit constants, will enable amateurs to secure improved performance from this all-important element of the receiving equipment.

Generally, in radio reception it is the function of the detector in some way to transform the impressed radio-frequency signal into an electrical

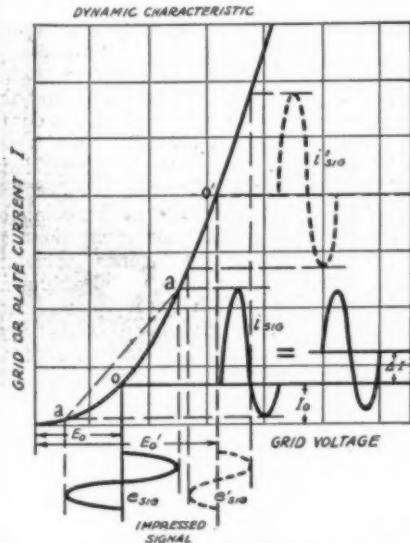


FIG. 1 — A TYPICAL DYNAMIC DETECTOR CHARACTERISTIC

It represents the relation between grid current and grid voltage for grid detection; or the relation between grid or plate voltage and plate current for plate detection.

circuit constants are considered and presented in graphical form for both triodes and screen-grid

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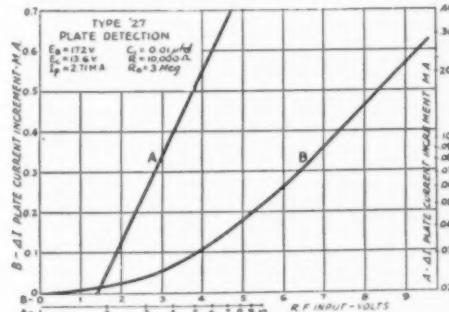


FIG. 2.—TYPICAL CURVES SHOWING THE VARIATION OF THE D.C. PLATE CURRENT INCREMENT WITH THE AMPLITUDE OF THE SIGNAL

Curve A is plotted on logarithmic scales and shows that detector output varies as the square of the signal voltage.

impulse varying at an audio frequency. Vacuum tubes as usually employed depend upon the non-linear relation between their inter-electrode currents and voltages for their detecting performance. This relation is shown by the diagram of Fig. 1. Here a typical dynamic characteristic is shown. This curve may represent the relation between grid current and grid voltage from

which grid detection is obtained; or it may be the variation of plate current with grid or plate voltage, corresponding to plate detection. The departure of this dynamic characteristic from a straight line, at least at certain parts, satisfies the

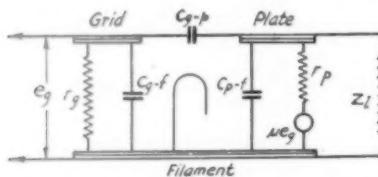


FIG. 3.—THE EQUIVALENT CIRCUIT OF A VACUUM TUBE

requirement of non-linearity necessary for detector operation.

Let us consider, for example, the operation of the tube as a plate detector, the principles of grid detection being analogous. Then the dynamic characteristic of Fig. 1 will be the so-called mutual characteristic, showing the relation between grid voltage and plate current. Remembering our fundamental detector requirement of non-linearity between current and voltage, let us choose an operating point in the region of greatest curvature as at "O." For a given tube, the general shape of the dynamic mutual characteristic will be similar to the curve of Fig. 1, although this is dependent also on the plate voltage and plate circuit load impedance Z_L of Fig. 3.

The operating point "O" is fixed for a given

component of the fundamental frequency of the impressed signal and components of higher harmonic frequencies. Only the fundamental component and the d.c. component are shown in the diagram at the extreme right. Thus, if the signal impressed on the grid is one of radio frequency, the resulting plate current will have a radio-frequency component which will not affect the headphones or audio amplifier, but is usually by-passed around them. However, the d.c. component ΔI will energize the headphones resulting in a dull plop similar to a key thump when the impressed signal is interrupted. This d.c. increment of plate current (ΔI) which adds to the steady d.c. plate current I_o when a signal is impressed, can be read on a d.c. meter in the detector plate circuit, providing the impressed signal is of sufficient amplitude.

The curves of Fig. 2 show the variation of this d.c. plate current increment ΔI with the amplitude of the impressed r.f. grid voltage. These measurements were made using a Type '27 as a plate detector at 1500 kc. The steady d.c. plate current I_o of 2.71 ma. was balanced out and only the plate current increment ΔI , due to the impressed signal, read on the plate milliammeter. The mathematical analysis¹ of the detector action, for small signal voltages, shows the detector output to vary as the square of the impressed voltage (neglecting distortion terms). To check this conclusion, the d.c. plate current increment ΔI and the impressed r.f. voltages were plotted on logarithmic scales resulting in

Curve A of Fig. 2. This is a straight line, the slope of which is 2.1, thus giving an experimental check on the square law detection factor. Curve B shows the same current-voltage relation plotted with uniform scales.

It should be noted at this point that in the usual detector application, it is not this d.c. plate current increment which produces the useful output signal. However, the audio-frequency plate current variation produced by modulated or heterodyne reception, results from this curvature of the dynamic characteristic in a similar though more complex way.¹

In the case where our operating point is not at a region of considerable curvature on the dynamic characteristic, as at "O" in Fig. 1, the plate current variation is identical with or approaches the grid voltage swing in wave shape. Thus the output is of the same frequency as the input and we have straight amplifier action (e'_{sig} and i'_{sig} of Fig. 1).

In the case of a grid detector, the curve of Fig. 1 would be the dynamic grid characteristic showing the relation between grid current and grid voltage. For this type of detector the operating point "O" is determined largely by the

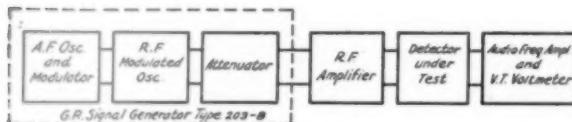


FIG. 4.—THE EXPERIMENTAL SET-UP WITH WHICH THE DETECTOR CHARACTERISTIC MEASUREMENTS WERE MADE

plate voltage (and given screen-grid voltage as well, in the case of a screen-grid detector) by the value of negative grid bias voltage. For any given operating point there is a corresponding d.c. plate current, indicated by I_o in the diagram. However, when the impressed signal reaches the grid, the grid potential varies around the bias voltage as a mean, depending on the character of the signal. The simple case of a pure sinusoidal signal is shown in the diagram, and by projection the resulting plate current variation is obtained (i_{sig} of Fig. 1). Because of the curvature of the dynamic characteristics, this resulting plate current variation departs considerably from a pure sine wave superimposed on the steady d.c. plate current I_o . By mathematical (see appendix) or graphical wave analysis this plate current variation can be shown to be composed of a direct current component (ΔI in the diagram), a com-

¹ See appendix following Part II.

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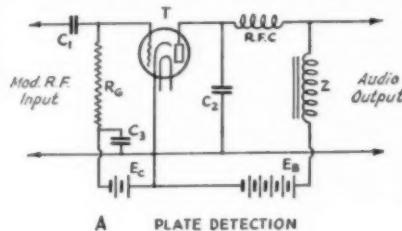
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potential of the grid return to the filament and the resistance of the grid leak. The detection principle is exactly the same. Here the audio-frequency components of grid current, produced by the curvature of the grid characteristic when receiving modulated or heterodyned signals, cause audio-frequency variations of the grid



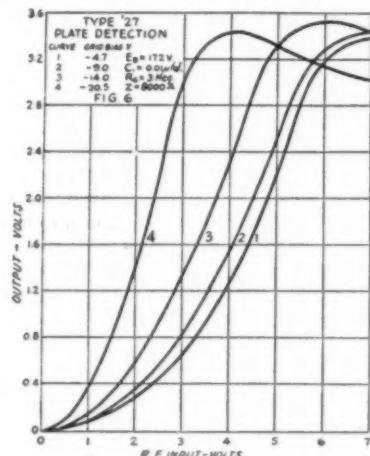
A PLATE DETECTION

FIG. 5

C₁ — Grid Condenser. R_g — Grid leak.
C₂ — 1000- μ fd. plate by- Z — Plate load impedance.
pass condenser. RFC — Radio frequency choke.
C₃ — 1- μ fd. grid bias by- T — Type '27 tube.

pass condenser.

potential which affect the plate current through pure amplifier action. Thus the detector performance depends on the curvature of the dynamic grid characteristic at the operating point. Usually, for small signal voltages this grid characteristic curvature is more pronounced than the curvature of the plate characteristic, resulting in greater sensitivity for grid detection. However, this cannot be taken too rigorously, since other

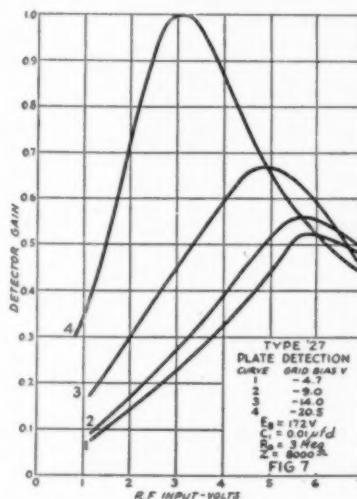


factors which we will now consider also affect the detector performance.

It will be noted from the diagram of Fig. 1 that the effective curvature of the dynamic characteristic throughout the region of grid voltage variation (*a-a* of Fig. 1) depends on the magnitude of the impressed signal voltage. Thus the operating point for maximum detector performance may be considerably different for low signal

levels than for relatively high signal levels. It is usually this factor that limits the use of grid detection to relatively low signal inputs whereas plate detection is usually employed for detection at signal inputs greater than two volts — so-called "power detection." The consideration of distortion becomes of prime importance in the case of the reception of voice-modulated signals and may determine the choice between grid and plate detection.

It would perhaps be well to note here that the terms grid and plate detection, as applied to vacuum tube detectors and as used throughout this paper, refer to the detector action resulting from the curvature of the grid or plate characteristic respectively. In the case of grid detection, detector action also may occur in the plate circuit — a condition which usually is undesirable and



which will not be considered here because of its complexity.

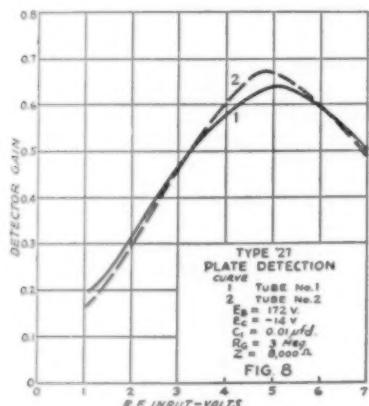
The diagram of Fig. 3 shows the equivalent circuit of a triode, or three-element vacuum tube. Here the inter-electrode capacities are shown as well as the internal grid and plate impedances of the tube (r_g and r_p). Z_t is the external plate load impedance.

In the case of plate detection, the grid is usually negatively biased to get down to the regions of greatest curvature of the dynamic mutual characteristic curve and hence the grid does not draw current. The internal grid impedance (r_g) is then very high, a condition which results in greater selectivity in the tuned circuit across which the detector is connected. In a circuit arrangement in which a tuned input circuit is also the coupling impedance of a radio-frequency amplifier, an increase in amplifier gain usually results when using plate detection. However, this increase was slight — but five per cent — for a screen-grid

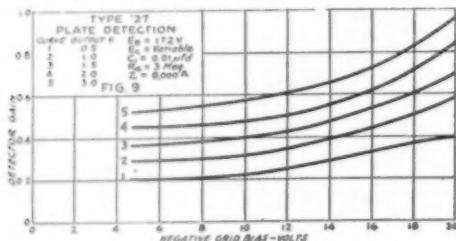
Type '24 amplifier giving a voltage gain per stage of 80 at 1500 kc.

As mentioned before, the curvature of the dynamic plate characteristic is affected by the plate voltage (and the external plate load impedance Z_L), thus influencing the detector performance.

Considering the plate circuit of Fig. 3 it is apparent that the equivalent voltage acting between the plate and filament, resulting from the signal impressed on the grid, reduces to the simple consideration of a generator of internal impedance r_p equal to the tube plate impedance, in series with the external load impedance Z_L . Thus for maximum detector power output (but not maximum undistorted power output) the familiar relation holds: The external plate load should be a pure resistance equal to the tube plate impedance. However, as usually employed, the detector output swings the grid of a succeeding audio amplifier tube and the detector output voltage across the external load impedance is the



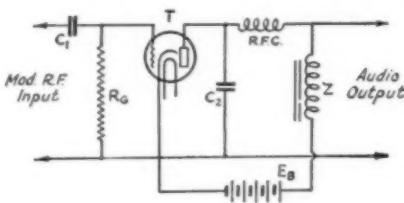
primary consideration. It can be shown readily that for the maximum output voltage across the load Z_L the internal plate impedance of the tube (r_p) should be negligible in comparison with the external load impedance. Hence the detector performance depends on the values of external load impedance and internal plate impedance.



Moreover, the internal plate impedance of the tube is a function of the plate and grid (and screen-grid) voltages, and all these factors enter

into the consideration of detection by means of vacuum tubes.

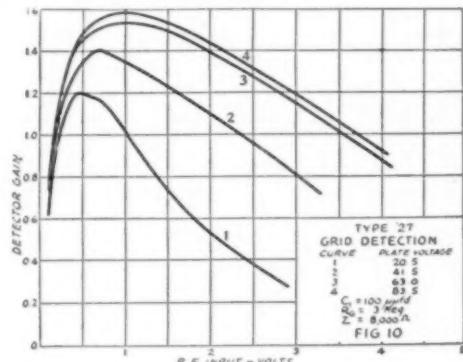
To demonstrate experimentally the variation of vacuum tube detector performance with the



B GRID DETECTION
FIG. 5

CONSTANTS SAME AS FIG. 5A

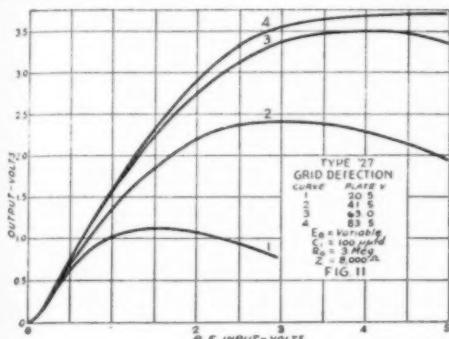
tube parameters and circuit relations as considered above, an extensive series of measurements were made. The experimental set-up employed in this study of detector operating characteristics is shown by the block diagram of Fig. 4. A General Radio signal generator Type 203-B supplied the modulated radio-frequency signal of a known percentage modulation and of a known and conveniently adjustable voltage. A screen-grid radio-frequency amplifier stage of known voltage gain was inserted between the signal generator and the input to the detector whose characteristics were being measured. The detector audio output (having the original modulating frequency) was magnified by an audio-frequency amplifier of known gain. The amplifier's output was measured by a vacuum tube voltmeter of the thermo-couple type.



Two representative types of vacuum tubes were employed and their characteristics measured as both grid and plate detectors. The Type '27 tube was selected as the typical triode detector because of its increasing use in receivers employing alternating current for filament heating. The rugged element structure of this type tube and general operating characteristics recommend it for use as a detector, as well as an amplifier, for applications requiring a three-element tube. The

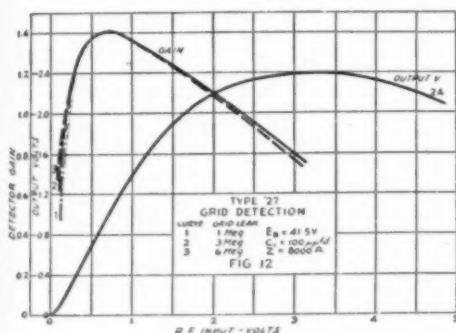
operating characteristics and detector performance curves which follow apply in principle to other types of standard three-element tubes, such as the Type '01-A, '12-A, etc., with some modifications.

The popular Type '24 tube was taken as the typical screen-grid detector because of its excellent operating characteristics and increasing use



as a detector as well as a radio- and audio-frequency amplifier.

Tubes having average constants for tubes of



their type were selected and several tubes were employed to check the performance. The greatest performance variation between tubes occurs (as would be expected) for tubes operating as grid detectors, since the grid characteristics of tubes of a given class are subject to considerable variation — more so than the plate characteristics.

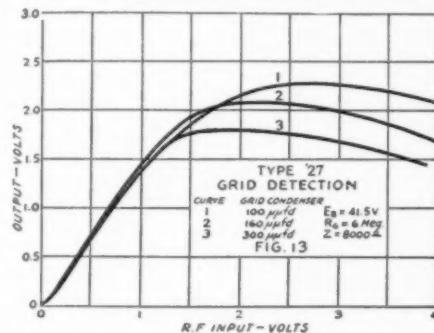
All of the following measurements were made at a carrier frequency of 1500 kc. A 400-cycle modulation frequency was employed with thirty per cent modulation of the output carrier except where measurements were made to determine the effect on the detector output of changing the percentage modulation. Although these conditions are not identical with those encountered in amateur c.w. reception, the detector performance is quite similar.²

² The measurements made by the author are for detectors without regeneration. Regeneration in the detector circuit will increase the over-all gain by increasing the ratio of alternating grid voltage to signal voltage, particularly at small values of signal voltage. The gain of the detector tube

TRIODE PLATE DETECTOR

We will consider first the Type '27 as a plate detector. The schematic diagram is given by A of Fig. 5. In this and the following schematic diagrams the circuit constants not listed were changed during the measurements and the detector operating characteristics determined for different values. Each performance curve indicates the operating voltages and circuit constants under which the measurements were made.

Detector gain is a convenient figure for comparing detector performance. It is simply the ratio of the audio-frequency output voltage of the detector to the radio-frequency input voltage to the detector. It should be noted that this gain



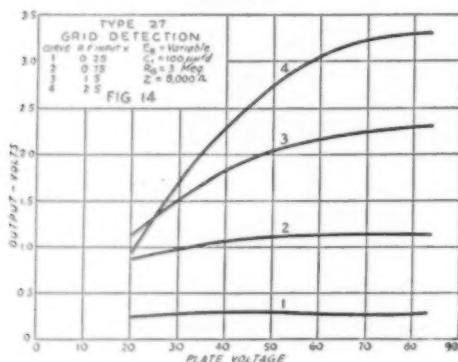
factor is directly proportional to the percentage modulation. This should be remembered when referring to the performance curves which follow.

The series of curves of Fig. 6 show the variation of audio output voltage (across an audio transformer primary used as the detector coupling impedance) with variation of radio-frequency input voltage. The effect of changing the operating point as a result of shifting the negative grid bias is clearly evident in the detector performance. The related series of curves of Fig. 7 shows the variation of detector gain with r.f. input for several values of negative grid bias. The maximum detector gain obtained for the particular value of plate load impedance employed in these measurements occurs with an r.f. input of three volts r.m.s. and with a negative grid bias of 20.5 volts. These values depend on the plate voltage and plate load impedance as well. It is evident from these results that the Type '27 as a plate detector requires a rather high r.f. signal voltage level for favorable operation. A radio-frequency input voltage level of two or three volts would have seemed impractical at these frequencies before the advent of the screen-grid radio-frequency amplifier with its high voltage gain per stage, but such detector signal levels are fre-

itself, however, should be approximately the same with and without regeneration. For information on the effect of regeneration on the received signal strength see the paper of that title, by Balth. van der Pohl, Proc. I. R. E., Aug., 1928. — EDITOR.

quently realized in modern broadcast receivers and demand "power detection."

From the curves of Fig. 7 it will be noticed that the maximum detector gain is obtained with different bias voltages, corresponding to different operating points on the dynamic characteristic, for increased r.f. signal input.



The curves of Fig. 8 serve to compare the performance characteristic of two different Type '27 tubes. From the curves of Figs. 7 and 8 it is apparent that the detector gain reaches a maximum for a certain input signal level (depending on the tube characteristics, electrode voltages and circuit constants) and then with increasing signal input the detector gain decreases. The importance of securing the proper detector operating conditions for the signal level at which one plans to operate for maximum detector gain is evident.

The curves of Fig. 9 show the variation of detector gain with negative grid bias for several different output voltage levels. These curves serve to give quantitative data on the performance of a Type '27 plate detector but are by no means complete.

TRIODE GRID DETECTOR

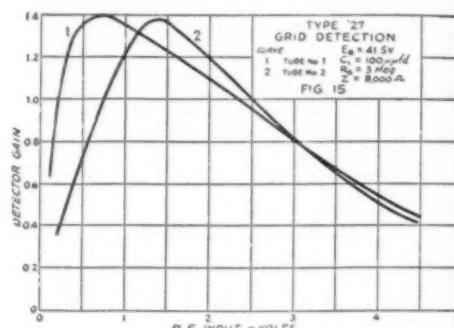
The performance of this type of triode as a grid detector is of greater interest to amateurs and is more closely related to amateur application. The schematic diagram of this detector arrangement is given by B of Fig. 5. It will be noted that the grid returns directly to the cathode of the tube through the leak, R_g .

The series of curves of Fig. 10 show the variation of detector gain with r.f. input for several values of plate voltage, and the corresponding series of curves of Fig. 11 show the audio output voltage variation under the same conditions. Again the detector gain reaches a decided maximum as in the case of plate detection; however, it should be noted that this peak gain is considerably higher than that previously obtained and is reached at a signal voltage level of 0.5 volts or less for the grid detector of this type. The increase in detector gain with increased plate

voltage is also well demonstrated, although a further increase over the values employed is not justified from the standpoint of either tube life or performance.

The curves of Fig. 12 show the effect on the detector gain of changing the value of grid leak resistance. The improved performance at the lower signal voltage inputs obtained with higher grid leak values is apparent, but the differences are rather slight. Curve 2-A shows the typical output voltage variation for these conditions.

The effect of the capacity of the grid condenser is clearly illustrated by the detector performance curves of Fig. 13. Here the audio output voltage variation with r.f. input is plotted and the in-



creased output with smaller grid condenser capacity is evident, though the effect is not great for grid condensers ranging from 100 μ fd. to 300 μ fd. At higher modulation frequencies (above 400 cycles) even better performance is obtained with the smaller grid condensers.

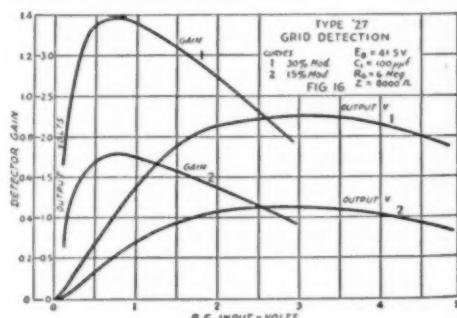


Fig. 14 shows the variation of audio output voltage with detector plate voltage for several input signal voltages. It is evident that for the low signal inputs — of the order of a quarter volt — there is little improvement in detector gain with increased plate voltage, but that at higher input signal levels the audio output increases considerably with increase in plate voltage.

The curves of Fig. 15 compare the performance

(Continued on page 82)

Naval Reserve Coöperates With Red Cross

Instructions Drafted for Emergency Communication in Disasters

A PLAN has been worked out between the Navy Department and the American Red Cross for the employment of the Naval Communication Reserve in times of emergency, when the Red Cross functions to bring relief to distressed communities. Detailed instructions have been drafted to govern the work of each participant in such work. We believe this question is of much interest not only to members of the A.R.R.L. who are also members of the Naval Reserve, but to all amateurs. It will be noted that Communication Method C-1 (referred to in Table A and in the text) provides for using amateur stations not affiliated with the Naval Reserve in case of emergency.

It is important to understand that *this plan in no wise supersedes the Army-Amateur Radio System for emergency communication*. The Army is the agency of our Government chiefly and directly concerned in acting towards the relief of the population in time of disaster. The Army-Amateur system exists as a method whereby individual amateurs on the scene may contact direct with the Army, from whom relief is to be expected. Of course every branch of the Government desires to be of assistance at such times. That normal desire, and the wish to give communication aid specifically to the Red Cross, are the actuating motives in the present Naval Reserve plan. For details on the functioning of the Army-Amateur net in time of disaster, see page 1, Communications Department section, *QST* for February, 1930.

The complete text of the Navy Department instructions follows:

NAVY DEPARTMENT
OFFICE OF CHIEF OF NAVAL OPERATIONS
WASHINGTON

7 June, 1930.

From: Chief of Naval Operations.
To: Commandants, All Naval Districts.
Commandant, Washington Navy Yard.
Subject: U. S. Naval Communication Reserve — instructions covering employment in emergency in connection with American Red Cross relief.

1. The National Headquarters of the American Red Cross conferred with this office on the subject of emergency communication in time of disaster when normal lines of communication are inoperative. Under such conditions, the Naval Reserve communication organization including individual members of the Naval Reserve owning and operating radio stations can be of very great help in saving life and relieving suffering.

2. The American Red Cross through the medium of its 3,500 local chapters is developing disaster preparedness plans so that when a disaster occurs in a given community the local chapter, through its disaster relief forces previously organized, can function immediately with the greatest degree of efficiency. Among the several sub-committees operating as a part of each local chapter's disaster preparedness plan is the Sub-Committee on Transportation and Com-

munication. It is on this Sub-Committee that the American Red Cross desires the members of the Naval Communication Reserve to be appointed as local liaison representatives of the Naval Communication Reserve.

3. In furtherance of the above, the following plan has been submitted to the Headquarters of the American Red Cross and has been approved by them. The Commandant of each Naval District will make appropriate arrangements so that the Naval Reserve Communication organization in his District, including each individual Reservist owning and operating an amateur radio station is furnished with complete instructions as to what to do in case of emergency.

4. Few serious local emergencies occur, but when these do arise, each Reservist should have the information that is necessary to permit instant and appropriate action.

5. *Types of Disasters.* — The types of disasters that may occur are divided into the following two major classifications:

- (a) *Predictable disasters;* such as
 - (1) General flood.
 - (2) Hurricane.
- (b) *Unpredictable disasters;* such as
 - (1) Fire.
 - (2) Earthquake.
 - (3) Tornado.
 - (4) Sleet storm or blizzard.
 - (5) Bursting dam, landslide, volcanic eruption, cloudburst, etc.
 - (6) Explosion.

6. Preparations for handling emergency communications for predictable disasters are not a difficult matter. Heavy rains or melting snows are usually responsible for floods. Hurricane centers can be located and the probable course predicted in advance. Under such conditions, Commandants of Districts involved should notify the Communication Reserve personnel of the District to prepare to man the Reserve stations of the District. Duty performed under instruction from the Commandant must be on a voluntary basis and without pay. Notices should be sent to insure delivery before commercial communication lines are destroyed. In addition, the Reservists should have instructions as to what to do in case of a major disaster over a large area, such as might be caused by floods or hurricanes. These instructions should provide for the following:

(a) Unit or individual amateur stations (Number One) will contact section, master or alternate control stations as per Table A (Method A).

(b) Section stations (Number Two) will contact master or alternate control stations as per Table A (Method A).

(c) Master or alternate control stations (Number Three) will contact Naval District Headquarters stations (Number Four) as per Table A (Method A).

In case any link in the Method A chain breaks down, it will be by-passed and communications carried on direct with the next numbered station in the chain.

7. Unpredictable disasters, usually of a purely local character, are the most difficult to provide for. Being entirely unexpected, no specific preparation is possible. In case a local disaster occurs, any Naval Reservist should attempt to send a report of the disaster to his Commandant at Naval District Headquarters, routing the message as follows:

(a) To any Naval Reserve radio station that is prepared to forward despatch immediately to the Commandant of the District in which the disaster has occurred. Table A (Method A).

(b) By calling the Naval District Headquarters on a regular Navy high frequency upon which a Naval District Headquarters is known to maintain a continuous listening watch. Table A (Method B).

(c) If (a) and (b) fail, by communicating with any radio station (amateur or commercial) on any frequency

that will result in communication. Table A (Method C1-C2).

(d) If case methods (a), (b) and (c) fail, by communicating with the nearest Army Corps Area Headquarters station. Table A (Method D).

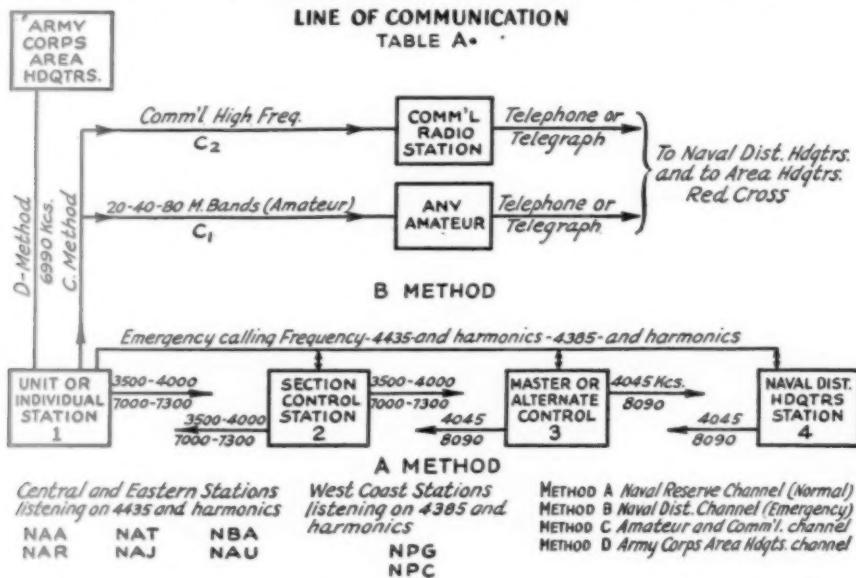
8. When loss of life or serious injury requires immediate assistance, in general equivalent to an "SOS" at sea, every means to effect communication should be adopted.

9. The foregoing plan provides for the delivery of emergency reports or messages to the Commandant of the Naval

furnished to individuals. A copy of Table A should be furnished to all Reservists.

12. The Red Cross requests that minor disasters be handled as above provided. However, a disaster of great magnitude should be immediately reported to the National Headquarters of the American Red Cross in Washington, D. C., in addition to the area branch office.

13. All messages addressed to the Red Cross where commercial charges are involved will be sent "Collect" and all messages sent by them will be "Prepaid."



District in which the disaster occurs. The Commandant will take such action as he deems necessary and will also immediately file an urgent despatch by Navy Radio or commercial landline, to the area office of the American Red Cross having cognizance. These are as follows:

(a) *American Red Cross, National Headquarters, 17th and D Streets, Washington, D. C.*, for disasters in the following States: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, District of Columbia, West Virginia, Indiana, Ohio, Kentucky, North Carolina, South Carolina, Georgia, Florida, Tennessee, Mississippi, Alabama and Louisiana.

(b) *American Red Cross, Midwestern Branch Office, 1709 Washington Avenue, St. Louis, Missouri*, for disasters in the following States: Wisconsin, Illinois, Minnesota, Iowa, Missouri, Arkansas, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Montana, Wyoming, Colorado, New Mexico and Michigan.

(c) *American Red Cross, Pacific Branch Office, Civic Auditorium, San Francisco, California*, for disasters in the following States: Idaho, Utah, Arizona, Nevada, Washington, Oregon and California.

10. Each Commandant will determine from the above list which States come within the jurisdiction of his Naval District and will therefore know to which area office of the Red Cross the disaster in any given State should be reported. In case a radio station in an affected area has no connection with the District Commandant, an attempt will be made to communicate with the next nearest Naval District Headquarters as per Table A (Method B).

11. A simple and complete system should be determined upon, inasmuch as it is quite probable that when a disaster does occur the individual who assumes the responsibility for sending the first word from such area may not have available detailed written instructions and plans covering the situation. Therefore, only necessary information should be

METHOD A Naval Reserve Channel (Normal)
METHOD B Naval Dist. Channel (Emergency)
METHOD C Amateur and Comm'l. channel
METHOD D Army Corps Area Hdqtrs. channel

14. All Naval Reserve radio personnel will be informed that the following information is desired when reporting a disaster:

(a) *First message* to report: type of disaster, location and as much additional information as is immediately available.

(b) *Second message* to report: area covered by disaster. Number of persons dead. Number of persons injured. Number of persons temporarily homeless. Number of homes destroyed. Number of homes damaged. Number of families affected.

15. As soon as any of the above information is obtained, it should be immediately forwarded as outlined above. Additional messages will be forwarded as rapidly as information is procured. Personal messages should not be handled until official messages concerning relief messages have been cleared.

16. All of the foregoing refers to messages sent from any affected area. Messages to the affected area will probably have to be handled by the emergency channels until the regular channels of communication are established. For instance, from Red Cross area office to Commandant, to Reserve station or amateur station which handled the outgoing despatches. For this reason, it is very important that each station inform each other station in the chain of their operating conditions, frequencies upon which they will receive and transmit and what schedules will be guarded.

17. The American Red Cross is advising all its chapters of the above plan.

18. Each Commandant is directed to disseminate the foregoing throughout the Naval Reserve organization in his District and to all individual Reservists of classes C-V (S) and V-3.

W. H. STANLEY,
Acting.

Standard Frequency System News

Pacific Coast Standard Frequency Station Appointed— Headquarters Standard in Operation

IT is our pleasant duty to report decided progress in the improvement of the League's Official Frequency System during the last month. The new Elgin station, W9XAM, is well on the way to completion and Mr. Urie writes that inauguration of their standard frequency transmissions can be expected in September. While the transmitter is being built and tested at Elgin, the station's secondary frequency standard is being assembled by General Radio at Cambridge.

THE PACIFIC COAST S.F. STATION

Our fondest hopes have been fulfilled. We are happy to announce the appointment of the Official A.R.R.L. Pacific Coast Standard Frequency station. This station will be operated by the Don Lee Broadcasting System (KHJ) of Los Angeles, Calif., with Mr. Harold Peery, W6AQG, Chief Engineer of KHJ, in charge. Associated with Mr. Peery in the S.F. work will be Mr. Ernest G. Underwood, W6ES, Technical Director of KHJ; Mr. Robert W. Murray, W6CTB, and Mr. Dean Moffatt. The assumption of Standard Frequency Transmissions by this group is made possible through the interest of Mr. Don M. Lee, owner of the Don Lee Broadcasting System, in the technical advancement of radio and of amateur radio in particular.

The call of the new station has not been assigned at the time of this writing. It will take several months to get the necessary frequency standard and transmitting equipment assembled but October should see the beginning of transmissions. Tentative schedules may be announced in the October issue of *QST*.

The frequency standard for this station will be on a par with that of W9XAM and the transmitter power will be similar to that of the other stations in the System. The strategic location of the Pacific Coast Station will make possible effective transmissions for amateurs in Oceanica and the Far East. It is hoped that early morning schedules can be arranged for amateurs in those parts of the world.

THE HEADQUARTERS' STANDARD

The League's Official Frequency Standard has arrived in Hartford, after being calibrated at the Bureau of Standards in Washington, and is now set up in the laboratory. Its specified accuracy is 0.005% (1 part in 20,000). A special receiver to be used in conjunction with the standard is being built and frequency checking operations should be

under way by the time this issue of *QST* is distributed. A complete description of the whole Headquarters' Standard Frequency set-up will appear in an early issue of *QST*.

W1AXV PROBABLY TO CHANGE CALL

The M. I. T. Laboratory at Round Hill has an application for a new license pending and it is quite probable that this station will be using a new call for the Standard Frequency Transmissions within the next month. The new call will be W1XP. This call will not be used for the QRG service, however, because the experimental license permits operation in the amateur bands for the transmission of Official A.R.R.L. Standard Frequency Schedules only. The old call, W1AXV, will be used for the QRG service described on page 47, May *QST*, and page 24, July *QST*. More fellows should make use of this direct calibration service as well as of the Standard Frequency Transmissions — and be sure to QSL. We always have plenty of S.F. report blanks here at Headquarters, yours for the asking.

The next two issues of *QST* are going to contain some of the finest articles on frequency measurement and frequency meters we have ever published, (if we do say so ourselves) and an entirely new and better type of frequency meter will be disclosed. Even though you may already have a frequency meter of an accuracy of within 0.1% or better, you cannot afford to miss this dope. Of course calibration from Standard Frequency Transmissions is an important consideration in this new development in frequency measurement. Get the habit of listening in on the S.F. schedules now and be ready to use them intelligently on your new meter next fall.

STANDARD FREQUENCY SCHEDULES FOR AUGUST AND SEPTEMBER

August 8, Friday				A
August 15, Friday				BB
August 22, Friday				B
August 31, Sunday				C
September 12, Friday				A
September 19, Friday				BB
September 26, Friday				B
September 28, Sunday				C

Time (p.m.)	Frequency, kc.		Time (p.m.)	Frequency, kc.	
	A	B		BB	C
8:00	3500	7000	4:00	7000	14,000
8:08	3550	7100	4:08	7100	14,100
8:16	3600	7200	4:16	7200	14,200
8:24	3700	7300	4:24	7300	14,300
8:32	3800	7400	4:32	7400	14,400
8:40	3900	7500			
8:48	4000	7600			

The time allotted to each transmission is now 8 minutes, divided as follows:

2 minutes — QST QST QST de W1AXV (or W1XP).

3 minutes — Characteristic letter "G" broken by call letters.

1 minute — Statement of frequency in kc. to nearest integral figure and announcement of next frequency.

2 minutes — Time allowed to change to next frequency.

The frequencies announced by W1AXV are accurate to within 0.01%.

The time is E.S.T. 8:00 p.m. at W1AXV is 0100 G.C.T. and 4:00 p.m. is 2100 G.C.T.

European listeners are urged to use and report on schedule BB which is transmitted particularly for them.

OFFICIAL MARKER STATIONS

Several applications for appointments as Marker Stations have been received and a number of others have signified their intentions of bringing their frequency measuring and transmitting equipment up to the standard necessary for Marker Station appointment. See July QST for details.

— J. J. L.

New England Division Convention

Portland, Maine, August 22-23.
(Maine Section)

WE are all set, fellows, for this year's Maine Convention to be held at Portland on August 22nd and 23rd at the Eastland Hotel. The Portland Amateur Wireless Association extends a cordial invitation to all hams; their mothers, fathers, brothers, YL's and OW's to be with us.

While there will be good talks, the committee contemplates plenty of entertainment; trips, moving pictures, etc. The Radio Supervisor or one of his deputies will be present. Everett L. Battey, Assistant Communications Manager, of A.R.R.L. headquarters, will be the official representative from Hartford.

Make your plans to attend and write Manley W. Haskell, 15 Hemlock St., Portland, Maine.

The Midwest Division Convention

IOWA STATE COLLEGE, Ames, Iowa, again extended a warm welcome to amateurs on May 9th and 10th for the annual Midwest Division A.R.R.L. Convention and Ninth Radio Amateurs' Short Course. Thanks are due Mr. D. C. Faber, Director of ISC's Engineering Ex-

tension Service, for the courtesies extended by his department. President Huntsinger of the Campus Club, Mr. Konkle of WOI, A.R.R.L. Director Huber, Section Manager Kerr and all others who assisted them and extended co-operation should receive credit in due proportion for the success of this convention.

The first day brought a record registration, and there were about 140 present at the banquet Saturday. The sessions in the engineering building got under way on scheduled time Friday afternoon, George Hansen, W9FFD, of the Tri-State Club presiding. Section Communications Manager H. W. Kerr, W9DZW-W9GP, officially opened the convention, and following his remarks Director Huber gave an account of the subjects considered and action taken at the A.R.R.L. Board of Directors' meeting in Hartford, from which he had just returned. Ensign "Chuck" Morgan, W9EFH, spoke interestingly on the U. S. N. (C.) R., clearly explaining the organization and its purposes. R. J. Rockwell of Omaha gave a good talk on practical methods of calibrating and adjusting condenser microphones. Mr. Walter of the Jewell Electrical Instrument Company next spoke on measuring instruments. F. E. Handy of A.R.R.L. headquarters discussed the new regulations, log-keeping, operating procedure, and reported on the seasonal characteristics of amateur activity. J. P. Dobyns, W9DXP, spoke on the Army-Amateur Net organizations. The afternoon ended with a discussion of directive antenna systems by Technical Editor Lamb of QST.

The evening was devoted to inspection trips and informal "hamfesting." All departments of the college were open for inspection with special demonstrations in connection with VEISHEA, the college's annual exposition showing the work of the several departments of the university to the public. For the most part the interest of "hams" was in the electrical lab., in WOI, and in the Campus Club shack where W9DTI was in full operation, and the wealth of convention prizes donated by generous manufacturers was on display.

The second day of the convention opened with a plea for frequency observance by F. V. Sloan of the Radio Supervisor's Office, who had devoted his time two previous days to giving commercial and amateur operator's license examinations. Causes and effects of off-frequency operation were discussed by F. E. Handy, A.R.R.L. Communications Manager, leading up to the different parts and types of amateur transmitters and the effect of each on frequency stability. Professor J. K. McNeely of Iowa State College lectured on radio interference. This was made doubly interesting by the display of his equipment and slides showing oscillograms identifying different sources and types of interference.

After lunch, the meeting was resumed with

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Vernon Holmes, of the University of Iowa Amateur Radio Club, presiding. A movie showing amateur stations was run off. The subjects for the afternoon disclosed an unusual amount of valuable technical information. E. O. Johnson, Service Engineer for R.C.A.-Victor, spoke first on "Transmitting Tubes." Carl Menzer, Director of WSUI, gave an intensely interesting and informative talk on "Improving 'Phone Transmitters," full of valuable tips for the proper handling of microphones and stations. J. W. Doty, KO1-W9GDG, discussed the work of Mr. Tydberg and himself on "Screen-Grid Detectors." F. H. Schnell, Chief of Staff of the Radio and Television Institute, spoke interestingly, stressing frequency observance. After showing the details on blackboard and screen, his new shortwave superheterodyne receiver was demonstrated. J. J. Lamb, Technical Editor of *QST*, followed with a discussion of oscillator-amplifier transmitters as the final subject of the afternoon.

The Campus Radio Club deserves hearty thanks for the banquet at the Hotel Sheldon-Munn on Saturday, which proved the climax to this most successful convention. Director Huber kept things moving in his capacity as toastmaster. The banquet speakers were S.C.M. H. W. Kerr (Grandpa to the Iowa boys), Headquarters' representatives including Technical Editor Lamb and his bride, Lt. Bellew, Ensign Morgan, J. P. Dobyns and F. H. Schnell. Everyone enjoyed the Cleveland Air Race Film which was a special feature of the program. The Liar's Contest *extraordinary* was won by Dobyns, W9DXP, who displayed greatest "inventiveness." The entertaining stories spun by Sadilex, W9APM, and a dozen others added to the fun, and competition was keen. Phil Konkle of WOI auctioned off some big power tubes to the highest

bidder. Then came the wholesale distribution of prizes including apparatus of all descriptions! There will be some fine signals on the air with all the power supplies and other station equipment put into use. (We hope the recipients will not forget to drop a suitable note of thanks to the manufacturers.) The convention ended at a late hour that night, some of the discussions lasting into the next day. Many are already planning on next year's Ames Convention again to benefit from the "short course" and renew friendships made over the air.

—F. E. H.

Strays

W1NX had an unusual experience recently. His chemical rectifier is installed in the cellar, and one day he noticed that his input was below normal and the signal was very unsteady. An investigation of the rectifier disclosed that a snake had crawled into the jars to keep warm. This snake got all the warmth he wanted — and more!

While experimenting with screen-grid detectors, W1ADF found that the secondary winding of a 3 to 1 Thordarson audio transformer makes a suitable coupling impedance for the plate circuit of the detector. The regular transformer connections cannot be satisfactorily employed because of the low impedance of the primary compared to the tube impedance.

The pocket testing device manufactured by the L. S. Brach Manufacturing Corp., Newark, N. J., contains a small neon lamp which will be found useful around the station. About 90 volts will start the bulb glowing.

—K6ECL

Finding the Expeditions

Expedition Station	Frequency (kc.)	Call Signal	Remarks
S. S. <i>Morrissey</i>	9100, 7500 (500 cycles)	VOQH	Bartlett Northeastern Greenland Expedition, Ed Manley, Operator.
Schooner <i>Bouddin</i>	5555, 8330, 11110	WDDE	MacMillan Expedition to Labrador, Greenland, and Iceland, Paul Davis of W1ADU, Operator.
Yacht <i>Antares</i>	8300 (200 watts) d.c.	WODK	Left Bermuda June 20 for Southampton England. Will go down coast of France to Gibraltar, then to Azores, Chance of W3AIQ, Operator.
Yacht <i>Mopelia</i>	6670	DAIV	Summer cruise * through the West Indies during July and August. Count von Luckner and party of fifty American boys, J. Pascal, Operator.
Cartwright, Labrador Greenland (east coast)	3500-band	VOSO	Grenfell Mission, Edgar V. Seeler Jr., Operator.
	7350, 13040	XORC	Second Roumanian Arctic Expedition, ** H. L. Bassett of W6BSB, Operator. Will start operation about Aug. 15 and be on lookout for all W signals.

* Count Felix von Luckner is offering a cup to be presented to the amateur operator who gives the best communication service to and from the *Mopelia* during this course.

** A worthwhile award is to be made to the amateur performing the greatest service for this expedition during its several months on location in Greenland.

The First Conviction Under the Radio Act

St. Louis Amateurs Coöperate in Running Down an Unlicensed Station

By Porter H. Quimby, W9DXY*

IN St. Louis the amateurs, through the agency of the O.B.P. Radio Club, maintain what is called an interference committee. This committee operates in conformity with the A.R.R.L. policy of self-regulation. It investigates complaints against amateurs and makes recommendations for correction of interference, coöoperating fully with the Department of Commerce in its endeavor to keep everybody happy under the Radio Act of 1927. The secretary of this committee is appointed by the club. He receives notice from the Radio Inspector, the broadcasting stations or the Radio Trades Association of St. Louis whenever one of these bodies receive a complaint of amateur interference. He investigates the complaint, calling on the club for men and materials to help him. If he finds amateur interference he makes the necessary recommendations for its correction, and usually gets immediate results. This or any other trouble he may find is reported to the club and also to the source of complaint. In this way very little policing is required from the Department of Commerce.

In November of 1929 a station started up in St. Louis, using the call letters W9ZR. It was being operated by one George W. Fellowes at 3633A Gravois Avenue, on about 1565 kc., broadcasting music, voice, telephone conversations, etc., and rebroadcasting such other programs as could be picked up out of the air.

Mr. Art Janssen, a neighbor of Fellowes, was unable to use his receiver when Fellowes was operating because the latter's signals covered about 75% of the dial and blanketed out other programs. Janssen asked Fellowes to correct the trouble and was quickly told where to go, with the comment that the station W9ZR was put up under the personal supervision of the Federal Government and must not be disturbed. Janssen then wrote a letter of complaint to the Radio Inspector, who referred it to our interference committee. The committee secretary called up Fellowes and asked him to correct the trouble. He also asked how he could broadcast music and entertainment on an amateur license, and whether he had such a license. He was told the station had been licensed by the Federal Radio Commission as an experimental station and could do about as it pleased, and if B.C.L.'s were inter-

fered with it was just too bad. The secretary then reported his findings to the Radio Club and to the Radio Inspector. He also reported the matter to me as the then Director and asked that I take steps to correct the matter. I wired the Supervisor, and action started.

Radio Inspector William J. McDonnell appeared on the scene, made a survey and referred the matter to the U. S. District Attorney's office, which in turn called on the Department of Justice to make an investigation and collect evidence for a prosecution. The Department of Justice assigned their special agent, John E. Brennan, W9AC, to the case, who requested coöperation from W9DXY, W9BEQ, W9PW, W9DLB, W9ZK, ex-W9AOT and others. Under the direction of Radio Inspector McDonnell these men were deployed to various points to receive and record the transmissions of W9ZR.

The investigation established that W9ZR was operating on or about 1565 kc. with a radiophone which caused interference throughout St. Louis and was heard as far away as Park's Airport, near Cahokia, Ill., and in the Federal Building at East St. Louis, Ill. The ingenuity of the amateurs made possible the recording of the complete program transmitted from W9ZR. Brennan of W9AC is to be especially commended for his work in this connection.

When the necessary evidence had been obtained, warrants were secured from the U. S. Commissioner for the arrest of Fellowes and a search of his premises. These papers were served on December 16th by Deputy U. S. Marshall Norton, with the assistance of the R. I. and amateurs deputized for this work. The station was found in operation at the time and the apparatus was dismantled and confiscated, and Fellowes lodged in jail. At a hearing January 16, 1930, before the U. S. Commissioner, sufficient evidence was introduced to cause the defendant to be bound over to the Federal Grand Jury. On February 12th this body returned a criminal indictment against Fellowes, charging the operation of a radio station for communication between the States of Missouri and Illinois without station or operator's license; that this station interfered with the reception of signals emanating from a licensed station of another state; that he rebroadcast programs of a duly licensed station without the necessary consent of such station. The maxi-

* Past-Director, Midwest Division, A.R.R.L. St. Louis, Mo.

mum punishment on conviction of any of these charges is a fine of \$5000 and a sentence of five years' imprisonment.

The case went to trial before Federal Judge Faris on May 6th in St. Louis. This being the first criminal prosecution brought under the Radio Act of 1927, Paul D. P. Spearman, Assistant General Counsel, John E. Baron of the engineering staff, and George I. Smith of the Licensing Bureau, all of the Federal Radio Commission, were in attendance. Mr. Spearman assisted U. S. Attorney Stattler with the prosecution, while Messrs. Baron and Smith were called as expert witnesses. Operators from KSD and KMOX and a number of amateurs were called on to testify. Every claim that was made by Fellowes in defense of his operation was refuted by testimony of government witnesses, composed largely of amateur operators, and resulted in his conviction by the jury in less than an hour.

The court commented at length on the necessity and value of a law regulating radio communication, and upon the wisdom and fairness of the Radio Act of 1927, stating that enforcement of this law was vital to the welfare of society. He stated that a violation should receive a substantial punishment, and thereupon sentenced the defendant to a term of one year and one day in the United States Penitentiary at Leavenworth, Kansas.¹

While the defendant was not an amateur, and was not using an amateur frequency, he had usurped an amateur call and was using typical amateur equipment and calling himself an amateur broadcast station. It was therefore important to the amateur fraternity that he be shut down and prosecuted, as he was flying false colors and calling down the wrath of his neighbors upon the amateurs. We, as amateurs, should feel highly gratified with the effort made by the several departments of the Government in removing from our midst a station that was operating to our detriment. The Government, on the other hand, should and does feel highly gratified with the whole-hearted cooperation afforded by the amateurs, as is attested by letters I have received from Mr. Stattler, U. S. District Attorney, Mr. Spearman, Assistant General Counsel of the Federal Radio Commission, and Mr. H. D. Hayes, U. S. Supervisor of Radio at Chicago.

Dummy Antennas

(Continued from page 16)

dummy and the other end in the neighborhood of the monitor. An untuned link circuit could be used for that super-low power set.

Monitoring for 'phone is also quite straight-

¹Fellowes is a British subject. With his consent he is being deported to England, rather than serve his prison sentence.—EDITOR.

forward and may be done in the same way as for c.w. A system of continuous aural monitoring used universally in broadcast transmitters is shown in Fig. 2. It consists of a vacuum tube linear rectifier coupled to the antenna circuit and feeding a loudspeaker or headsets through an output transformer.

The commercial monitor has a big job. It actuates a signal relay, furnishes excitation for an oscillograph and operates a half dozen or so speakers through a one- or two-stage amplifier. Consequently, commercial monitors use tubes ranging up to the 50-watt size so as to supply sufficient power.

However, for our use we will find a Type '16-B or a Type '81 more than big enough to operate a loudspeaker, and a Type '01-A with grid and plate tied together will rectify sufficient power for headset operation. The filament supply for the monitor tube can be obtained easily from the transmitter filament supply, dropping the voltage by resistors if necessary. The size and the number of turns on the pick-up coil are relatively unimportant. For headset or small speaker operation, the output transformer might be done away with by using a by-pass condenser across the headset or speaker.

When using a dummy, phonograph records make a very good method of checking up on an amateur radiotelephone set. Lacking facilities for that, an assistant speaking into a microphone in another room might be substituted.

Come on fellows, help reduce the QRM! Two bits and a trip to the junk box will fix you up with that dummy antenna.

Strays

The International Resistance Company has prepared a booklet entitled "Resistor Replacement Guide," which is a compilation of circuit diagrams of popular broadcast receivers marketed during the past three years, with particular reference to resistors. Power ratings and resistance values of all resistors used in the sets are indicated, so that the proper type of replacement unit to choose can be quickly determined.

Copies of the guide will be sent free of charge to dealers and service men on request. Inquiries should be addressed to the above company at 2006 Chestnut St., Philadelphia.

The range finder of an ordinary Kodak makes a first-rate microscope for examining the edges of a crystal for small cracks and chips, since it has a great deal more magnification than the ordinary reading glass. The crystal should be held next to the finder and the latter close to the eye.

—Ex-W6BOY, W6BZW

Experimenters' Section

7-MC. CRYSTALS

By Herbert Hollister, W9DRD*

THE old order changeth, and our 1.75-mc. quartz plates are now in a class with our last summer's golf pants. They are not only obsolete, but they just won't fit.

Doubling into the 14-mc. band with 1.75-mc. plates requires too many tubes and more plate power than the result justifies. The trick is still being done with 3.5-mc. oscillators, but now that the 28-mc. band has been dished up to us on a platter by the pioneers, we are faced with the same old problem.

All of which forces attention to those terribly fragile little beasties, the youngest useful members of the piezo family: 7-mc. crystals. With plates of this frequency it is possible to operate in the 7-mc. band by straight amplification, the 14-mc. band by doubling once, and the 28-mc. band by doubling twice. It is the purpose of this article to emphasize the fact that these ultra-thin plates are in every way practical and desirable.

The few 7-mc. plates which have been used during the past three years have been almost without exception cut on the thick axis ("X cut"). Plates cut on this axis average about 2.6 meters per .001" of thickness, which means a 7-mc. plate will finish up about .016" thick. This would seem to be a very desirable advantage over the .011" thickness of the thin-cut plates of the same frequency.

However, the thick-cut plates have earned for themselves rather a shady reputation through their erratic behavior.¹ After nearly three years of jiggling the holder to make the plate start up, carefully washing the plate in Carbona at least every third day and grinding out the burned spots on the holder plates once a week, the idea finally occurred to us to do something about it.

After reviewing the advantages of the thin-cut plates over the thick-cut ones at 3.5 mc. it seemed logical that the same advantages might hold for 7 mc. It was recalled that the thin-cut plates would oscillate more readily than the thick-cut ones even when the thickness of the plate was not exactly uniform. Edge finishing on the thick-cut plates was also much more important than on the thin cut. The "proof o' the pudding is in the

eating," so a thin-cut blank was ground down to about .011" thickness. From its first test in the oscillator, this little wafer has shown no tendency to develop the idiosyncrasies of the thick-cut plates.

Obviously a plate so thin requires careful handling, but even so it is easier to grind a useful 7-mc. plate from a thin-cut blank than from a thick-cut one. About the only precaution to be observed is to keep from grinding the center of the plate thinner than the edges. This is very apt to happen, because a plate so thin is quite elastic and will bend with the pressure of the grinding finger unless it is reinforced by a flat piece of glass or metal. A piece of microscope slide about one inch square, ground flat on a new piece of plate glass with FFF abrasive, makes a fine backbone for the grinding job.

The blank should first have one face carefully finished with FFF or No. 500 Alundum or Carborundum grain. If the plate is held so as to reflect light from an electric lamp, it will be possible to tell when the entire face is smoothed up. From then on all of the grinding is done on the other side. When a thickness of about .025" is reached it will be necessary to moisten the crystal with a drop of water and stick it to the previously prepared section of microscope slide. If this is not done it will be impossible to keep the hills and valleys out of the plate. After .020" is reached the pressure of the finger should be somewhat lighter than before or the crystal may be crushed to pieces against the abrasive. Down to about .015", No. 150 grain may be used but from there on nothing coarser than FFF will do. The finished plate may well be .0003" thicker in the center than at the edges.

The slab used for 7-mc. plates should not be too large, because of the danger of breakage and the greater difficulty of obtaining a plane surface. The ideal size seems to be about $\frac{3}{4}$ " square, for there seems to be no greater output obtainable with larger sections.

Many of these very thin 7-mc. plates have been ground here and a few have been broken, so we feel competent to point out the most likely points of danger. Probably the easiest way to break a crystal is to catch it in the micrometer while checking it for thickness. Another excellent method of making little ones out of big ones is to bear down hard while finishing up the edges on a carborundum stone. But by and large there is nothing prohibitive in the grinding of a 7-mc. plate, and it is our opinion that anyone who can turn out a good oscillator at 3.5 mc. can do the same thing with a 7-mc. plate. Just a little more patience is required.

* Edwardsville, Kansas.

¹ This conclusion does not agree with observations of other experimenters. The "thin" or "Y cut" crystals often resonate at two frequencies fairly close together, whereas the "thick" or "X cut" crystals do not exhibit this characteristic. See page 41, April, 1930, *QST*. — *Ed.*

One very interesting fact has been noted while testing these 7-mc. plates in various holders. It seems that the size and surface condition of the holder plates has a decided effect on the frequency of the oscillator. It has been possible to change the frequency of a 7-mc. plate by as much as 16 kc. by simply transferring the plate to another holder. No attempt has been made to learn the reason for this, but that it is a condition which has advantages and disadvantages is quite evident.²

Most any sort of a holder that works well with thicker plates will do for the 7-mc. plates but a rather light top plate is desirable. About 200 volts on the plate of a Type '10 oscillator seems to suit the thin crystals very well.

BIAS FOR THE POWER AMPLIFIER

The problem of obtaining fixed bias for an amplifier following a crystal controlled oscillator without investing in several blocks of "B" batteries has been solved by R. B. Lawrence, W6DXK, who uses the plate supply to the crystal tube to provide the bias for the amplifier. The circuit diagram is shown in Fig. 1, and here are his remarks about it:

"While constructing a piezo-electric controlled transmitter recently the item of negative bias for

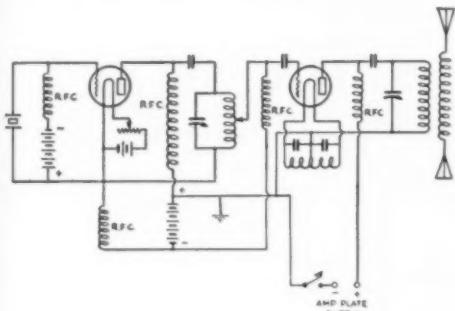


FIG. 1

the amplifier came under consideration. The price of the number of 'B' batteries prohibited their use, and a 135-volt 'B' eliminator is not entirely satisfactory. Consequently, it was necessary to dope out some form of circuit whereby the oscillator power supply might be made to perform a double duty and supply bias for the amplifier.

"The circuit diagram herewith sufficiently illustrates the idea. The constants of the circuit

² The oscillation frequency of any crystal is determined not only by the crystal itself but also by the conditions under which it is working. The frequency can be varied within small limits by simply changing the pressure on the crystal or, if there is any air gap between the top plate and the crystal, by varying the width of the gap. The *General Radio Experimenter* for February, 1930, will be found interesting in this connection. — *Ed.*

are the same as in ordinary practice. The only noticeable difference between this circuit and the usual oscillator-amplifier circuit is that of a separate filament supply for the oscillator and a grounded positive supply for the oscillator plate voltage.

"This circuit may be keyed in any fashion the individual may prefer. I have shown keying in the negative supply lead to the amplifier but did not illustrate a key-thump filter as it would be up to the individual to decide upon the form satisfactory for his installation."

SOME HARMONIC PECULIARITIES

Most of us have, at some time or another, listened to our transmitters on receiver harmonics, or tuned the receiver to a harmonic of the transmitter, and wondered why a note which was always reported pure d.c. on the air had so much r.a.c. in it in our own receivers. The natural inclination is, of course, to doubt the veracity of the other fellows and believe our own ears. However, it may be that the ears are at fault and the audience is right! The following letter from E. G. Watts, Jr., of Miami, Florida, explains why:

"Most of us have used a receiver with one of its harmonics beating against another oscillator, and have noticed that some of the receiver harmonics produce beat notes having a queer twang quite unlike the ordinary pure beat note. It sounds like nothing so much as the 'meow' of a cat. I wonder how many of us ever stopped to figure the phenomenon out. I ran across it several years ago while checking crystal oscillator performance on the harmonics of a broadcast receiver. I have never seen mention made of it in any publication. It is very simple, and perhaps well known, but I would like to offer my version of the explanation.

"If the second harmonic of a receiver of the ordinary autodyne type is made to beat against the fundamental of an oscillator having an unmodulated output, in the absence of appreciable oscillator harmonics the beat note produced will be the ordinary pure whistle; to all intents and purposes, a single frequency. Let harmonics of strength comparable to the fundamental now be added to the oscillator. The receiver harmonics are already assumed to be of this strength. The second harmonic of the oscillator will now form a beat with the fourth harmonic of the receiver, and so on down the line, with all the even harmonics. While this collection of beats is at zero beat simultaneously, at any other audible beat frequency no two are alike. The frequency of the beat produced on any given harmonic is greater than that which would be produced on the fundamental (none is being produced on the fundamental in this example) by the number of the harmonic. Thus in an instance where harmonics of both receiver and oscillator are strong, we hear a composite collection of frequencies simultane-

ously, caused by the harmonics as well as fundamental, instead of the single pure tone ordinarily heard. These tones combine and recombine, beating together to form new tones not fundamentally present, and the result is the queer sounding twang, which is quite unique. It is worth the effort to hook up the apparatus just to hear it. The usual crystal-controlled oscillator and the ordinary receiver have sufficient harmonic components to produce the effect noticeably. The reason it is present on some of the receiver harmonics and not on others, is that the even harmonics each produce a beat, while a little thought will show that only every *third* odd harmonic forms a beat, with the result that the effect is not usually discernible on odd harmonics. Therefore, we have in this a means of distinguishing even harmonics from odd.

"It is also plain to be seen why a monitor working on harmonics, either its own or those of the transmitter, cannot be relied upon to give an accurate indication of what the transmitter sounds like at the distant receiver. When a receiver harmonic is beating against a modulated source (transmitter with ripple, for instance) where the harmonics of the latter are also present appreciably, the note will sound worse than it actually is, due to the multiple beat effect and the combination of the modulation products. This effect will be greater on the even harmonics of the receiver than on the odd, because of the larger number of harmonics in the former case, which are effective in producing multiple beats. When the monitor is tuned to a transmitter harmonic the note will again sound worse than it actually is, since the defects in the transmitter wave are multiplied directly by the number of the harmonic.

"I have been repeatedly surprised at the number of otherwise well informed amateurs who are under the impression that harmonics exist on both — i.e., low and high frequency — sides of a fundamental oscillation. That harmonics exist only as multiples, and not fractions, of a fundamental, is clearly demonstrated by the following effect, which is useful as well: Tune an oscillating receiver to zero beat with an oscillator. Then tune another oscillator to five times this frequency, or any other high harmonic, as the effect is more clearly defined the higher the harmonic. Adjust for zero beat as heard in the receiver, and then detune the receiver, noting the beats. One will extend over a wider range than the other. In fact, the ratio of the two ranges is equal to the number of the harmonic to which the second oscillator is tuned. If the receiver dial can be read closely enough to compare the two ranges, as measured from inaudibility on one side, through zero beat, to inaudibility on the other, and the ratio thus determined, an unknown harmonic can be evaluated. The effect is due, of course, to the fact that the receiver covers more

territory on the harmonic, in proportion to the degree of the harmonic. Now, if a harmonic existed at one-fifth the oscillator frequency, as well as at five times, it would obviously cover the same range as the beat from the first oscillator, which is in resonance with the receiver. But it does not.

"Occasionally a quartz crystal in the process of grinding will cause its oscillator to generate myriads of frequencies which set up countless beats either side of the main oscillation. This is a condition of super-audible parasitic oscillation, of frequency generally between 10 and 40 kc. If the adjacent beat notes overlap slightly the frequency is likely near 10 kc., and if spaced apart, higher. The beats are the side bands of the super-audible frequency and its harmonics, beating against the fundamental frequency. The extent to which the beats extend either side is dependent on the strength of the harmonics. Since they usually extend several hundred kilocycles, harmonics as high as the 25th must be appreciable. This parasitic oscillation is probably a mechanical action in the vibration of the crystal, or may be a beat between two higher frequencies. I have known of several crystals producing audio frequencies in this same manner, sufficiently sustained to nicely modulate the wave. The tone was also audible directly from the crystal mounting. The lowest frequency I have heard thus produced was below 500 cycles."

SCREEN GRID DETECTORS IN PUSH-PULL

The use of the screen-grid tube as a detector for high-frequency reception is increasing rapidly, and some experimenters have been searching for means of obtaining oscillation at higher frequencies than the usual detector connections will allow. J. S. Cebik, W1ATG, found that the tubes would operate satisfactorily in push-pull on frequencies where a single tube could not be made to oscillate. He writes as follows:

"It has been occasionally mentioned that screen-grid tubes do not oscillate readily on frequencies above 18 or 19 mc. because of the internal capacity between the elements. A way to get around this is to use screen-grid detectors in push-pull so that the tube capacities are in series.

"It will be noted in the diagram, Fig. 2, that the tuning capacities are in series so that the capacity of each section of the double condenser must be about twice as large as the size normally used in a single-tube detector circuit.

"The rotor plates of condensers are grounded, thus allowing the inductance and the circuit to find its own electrical center and making it unnecessary to match tubes in this circuit.

"The screen-grid voltage has been found to be critical. Without the correct adjustment the circuit will not oscillate properly. A variable resistor in the plate circuit is used to control oscillation.

"The inductances are wound on tube bases and

the antenna coil is made adjustable to obtain best results. The receiver should either be completely shielded or the filament and plate supply be spaced at least three feet from the receiver to

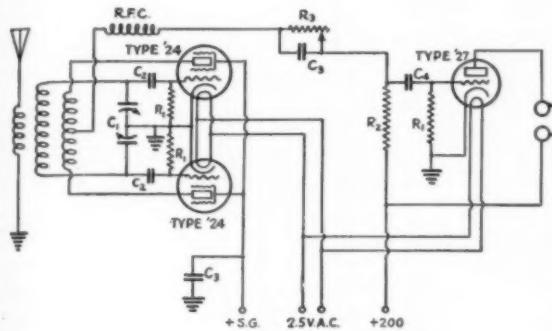


FIG. 2

C_1 — 250- μ fd. Cardwell condenser (transmitting type) with stator divided into two equal sections, insulated from each other.
 C_2 — 100- μ fd. fixed condenser.
 C_3 — 1 μ fd.
 C_4 — 6000 μ fd.
 R_1 — 1-megohm grid leak.
 R_2 — .25 megohm.
 R_3 — 100,000-ohm variable resistor.

No data on the coils are given, since this will depend largely on the layout of the receiver itself. The proper sizes for the various bands can be determined by the "cut-and-try" process.

eliminate a.c. hum. This circuit requires a larger tickler to make it oscillate than the single tube detector circuit.

"The writer would be interested to hear from others who have done any experimenting along these lines."

CONVERTING THE SINGLE CONTROL TRANSMITTER TO PUSH-PULL

Dallas Johnston, W9AAG, of Viola, Ill., writes us that the push-pull version of the "TNT" transmitter described in December *QST* has better frequency stability with changes in plate voltage, as well as greater power output, than the original single-tube outfit. He has been using a pair of Type '12 tubes in the set with about 400 volts on the plates.

The circuit at W9AAG is shown in Fig. 3. The set has not been used on 3500 kc., so no constants are given for that band. As an approximation, L_1 should have 14 turns of copper tubing, $2\frac{1}{2}$ inches in diameter, and L_2 about 60 turns of No. 30 d.c.c. on a 1-inch tube. It must be remembered that the grid coil dimensions given in Fig. 3 are for Type '12 tubes, and other types will probably require some modification of these coils. The number of turns on each should be adjusted until best output is secured.

The two grid coils may be combined into one center-tapped coil, if desired. Approximately the same total number of turns will be required. This arrangement was used in the oscillator

portion of the low-power oscillator-amplifier transmitter described in September, 1929, *QST*.

W9AAG has been successful in working both coasts consistently with this outfit, and the signals are often reported "crystal d.c." A good d.c. plate supply is used, of course.

AN A.C.-OPERATED RECEIVER WITH D.C. TUBES

A California experimenter, who wishes to remain anonymous, writes as follows:

"I should like to call to your attention a method of constructing an a.c.-operated short-wave receiver which I have found quite satisfactory. It uses Type '99' tubes, with filaments, plates, and grid biases all supplied from a 'B' eliminator. Fig. 4 shows the circuit.

"A Clarostat is inserted, if necessary, between the eliminator and the set, and so adjusted that 60 ma. are drawn. The resistance R_1 may be 367 ohms, R_2 50 ohms, and R_3 1000 ohms. These resistances are conveniently made by winding them one after another on thin bakelite strips about an inch wide, using No. 40 Advance wire and giving a coat of shellac after adjustment to the proper values. The wiring of such a set is very unobtrusive and simple, and because of complete

separation of currents in the various stages, feedback is eliminated without any filtering. Of course, a second audio stage can be added using

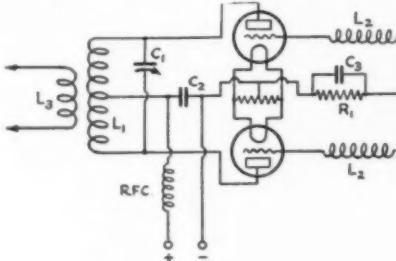


FIG. 3

C_1 — 500- μ fd. variable condenser.
 C_2 — 2000 μ fd.
 C_3 — 250 μ fd.
 L_1 — 6 turns of $\frac{1}{4}$ " copper tubing, $2\frac{1}{2}$ " inside diameter, for 7000 kc.
 L_2 — 3 turns of $\frac{1}{4}$ " copper tubing, $2\frac{1}{2}$ " inside diameter, for 14,000 kc.
 L_3 — 25 turns of No. 30 d.c.c. on 1" form for 7000 kc.
 R_1 — 12,000 ohms.
 R_2 — 75 ohms, center-tapped.
 RFC — 225 turns of No. 30 d.c.c. on 1" form.

The antenna coupling coil, L_3 , will depend on the size of the antenna or the tuning system used. Any of the common coupling arrangements may be employed.

the same system; and it is also simple to put a screen-grid tube before the detector if desired. The DeForest people make a screen-grid tube, the

422-A, the filament of which draws only 60 ma. "The freedom from hum of such a set is all that could be desired, particularly if the 'B' eliminator is so constructed that a choke is placed in each of the leads of the filter. Be sure, of course, that the B eliminator will give 60 ma. at the voltage needed. It is better to use a Type '80 tube than a Raytheon in the eliminator, since many small crackling noises are thus avoided, but a Raytheon will do quite well. The detector grid return works better on the negative filament lead of the '99 for me; but this seems to depend on the amount of plate voltage supplied to the detector. Fringe howl may be taken care of by any standard method.

"The main advantage of such a receiver is that it perks right away, without waiting for a Type '27 to warm up."

THREE-WIRE REMOTE CONTROL WITH MERCURY VAPOR RECTIFIERS

By Eugene A. Hubbell W9ERU*

THE average amateur is generally quite aware of the advantages of remote control, but is discouraged at the prospect of running a pair of wires for the keying relay, a pair of wires for the power supply, and, if he owns a mercury-vapor rectifier, another pair of wires, or at least one more wire, for the filaments of these tubes. In the remote control system to be described three wires perform all these functions.

Fig. 5 shows a pair of 6-volt relays, arranged to turn on the power and also key the transmitter. Relay No. 1 consists of a single long electromagnet, with two armatures, each with separate spring tension adjustment. One armature is set with a loose spring, so that it will close with approximately three volts applied to the magnet, while the other is set with a stiff spring, and does not close until nearly the full six volts are applied. This relay can be constructed from any old magnet, and since it will remain in the circuit drawing current as long as the rectifier tubes are on, it should have comparatively high resistance, so the battery will not discharge quickly. The relay at W9ERU was bound with No. 30 d.c.c. wire, some 1500 turns on a soft iron core, and has approximately 12 ohms resistance. This draws a half ampere continually, which is but the equivalent of two Type '01-A tubes, and will run a transmitter a long time on a single charging.

The return wire from one side of the power relay is connected to one side of the keying relay, No. 2. In series with this center lead, a six-volt battery is connected. The other lead from the keying relay returns to one side of an ordinary jack, into which the key is plugged.

The dotted lines indicate the control box, which takes the form of a 4-inch cube at W9ERU.

The center wire connected to the two relays with the six-volt battery in series terminates at one side of a single-pole single-throw switch on the

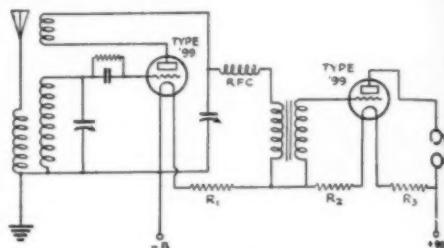


FIG.

control box panel. The other wire from the power relay terminates at the other side of the single-pole, single-throw switch, S_1 , with a resistance in series of a value sufficient to cut the voltage on the relay down to about three volts, or whatever value will allow both armatures to work satisfactorily, yet not close the armature controlling the plate supply until nearly the full six volts is applied. The second single-pole single-throw

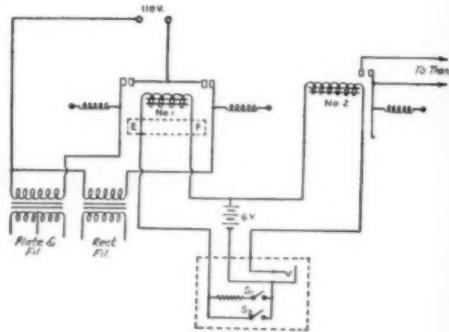


FIG. 3

switch, S_2 , shorts the resistance out. It is impossible to close the circuit of the plate transformer until the rectifier filaments have been lit, although the circuit may be closed immediately after, with consequent damage to the tubes.³

Since the total amount of resistance in the relay circuit when the filaments of the rectifiers are lit limits the current to a small value, there is no need to build trick relays to lessen the drain. If good magnets are used, with a bar of iron at E-F, indicated by dotted lines, the full amount of current used to operate the transmitter should total not more than one-half ampere at any time,

³ During a QSO switch S_1 may be left closed, thus keeping the filaments of the rectifier tubes hot while receiving. Plate power is then switched on and off simply by throwing S_2 . If a separate filament transformer is used for the transmitting tubes, its primary may be put in parallel with that of the rectifier filament transformer. — *Ed.*

depending quite a bit on the keying relay, of course.

The contacts for the 110-volt circuit may consist of heavy silver, or any metal of good current-carrying capacity which will not burn easily. At W9ERU carbon and steel contacts have been found very successful. The relay must be covered, however, or sparks may fly occasionally.

MOUNTINGS FOR TRANSMITTING COILS

Theodore Stahl, of Jackson, Mich., sends us a suggestion for mounting copper-tubing coils which not only provides for convenient changing of coils and good electrical contact but also allows variation of coupling.

A drawing of the mounting is shown in Fig. 6. It is made from a brass block $1\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ inches, and can be constructed with the aid of a few tools of the type usually found in the home workshop. Two of these blocks are of course required for each coil.

The tapped holes are fitted with screws which serve to fasten the block to a sub-panel or bracket. The screw which is threaded through the right-

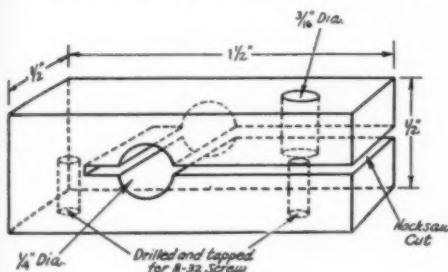


FIG. 6

hand hole should be long enough to project through the $3/16$ " hole in the upper section of the block, and a nut is put on it to allow adjusting the tension on the coil end when inserted in the $1/4$ " hole. A wing-nut will be handy for rapid changing of coils.

If the ends of the copper-tubing coil are straightened out for a length of four or five inches the coil may be slid back and forth in the blocks, thus allowing coupling to be varied.

RE: SCREEN GRID DETECTOR

Amateurs having troubles with screen-grid detectors may profit from the remarks of E. B. Redington, WSAJ, of Savannah, N. Y. His difficulties were many, and he writes concerning their cure as follows:

"Remember in *QST* a few years back the article entitled *If You Only Try?* I have been very much reminded of that while doing some work with screen-grid regenerative detectors.

"I built the receiver described in the April *QST* in the article, 'The Superiority of Screen-Grid

Detectors.' Apparently every screen-grid outfit is a problem in itself. Mine didn't perk at all well. I tinkered with the detector leak resistor and finally it worked after a fashion with 15 megohms but had a bad fringe howl. If I tried 10 or less, it had a hangover of from 4 to 5 degrees on 3500 kc. and 20 degrees on 14,000 kc. Too many, said I. Furthermore I was forced to use a 100,000-ohm leak in the audio stage. The amplification was terrific, however, and I can believe everything I have read about such receivers.

"It also had a bad tendency to howl if I brought my hand near. I cured this by shielding the control grid lead with copper tubing and grounding. But still the fringe howl and the need for such a high leak value. This may sound like a fairy story and apparently there is no reason in this madness of mine at all, but it worked. I built a shield for the detector bias battery, leak and condenser and put them all in it. I also shielded the r.f. plate leads and grounded them. Presto, I can use any value of grid leak down to 5 mgs. and any plate voltage from 90 to 200 on the detector and the smoothest and quietest operation obtain. Even with the filaments lighted with 12.5 cycle current ($\frac{1}{2}$ -wave 25-cycle rectified by a trickle charger) there is absolutely no hum. Normally I use either a storage battery or 25-cycle a.c. The filaments are in series.

"Measurements with a vacuum tube voltmeter show that my Type '01-A set is only about a quarter as sensitive as the screen-grid outfit. That is, signals which give one scale division deflection with a Type '01-A will show 4 to 5 with the screen-grid receiver. I found, however, that Type '24's are not very uniform when used for detectors on short-wave work.

"Here is a stunt which the gang may find useful. I use an 8-plate Pilot midget taken from my old plug-in Handbook outfit and also the 3-plate Pilot, connected in parallel. On the 3500-ke. band I tune with the big condenser and use the small one as a vernier. For the 7000-ke. and the 14,000-ke. bands I use the big condenser to bring the coils for these bands up to the proper point and then use the small one to tune. This way I get full-scale coverage on any band. Furthermore, I can run up to 9000-ke. and down to almost 5000-ke. with unbeatable tuning conditions."

Another experimenter, George E. Tower, W9DGJ, had trouble not with the operation of the set itself, but with noise from the a.c. line. Here is his letter:

"I have been experimenting with a high-frequency a.c. receiver since I received my April *QST* and encountered more troubles than I could record. I cleared them one at a time until but one was left.

"I was getting a weird noise that was halfway between a power leak and a spark transmitter with a rough note. Trying to detect its origin in any one part of the set proved futile. The only

thing that would cure it was eliminating the a.c. from the heaters and using d.c. on them. But I could not continue very long with a 7-amp drain on my battery, so I tried using a Type '24 tube as detector and two Type '01-A's as amplifier, using a.c. on the detector and d.c. on the amplifiers. This worked very well and was free from noise.

"I thought my noise must have been coming from the a.c. amplifier so I constructed an amplifier just like the one I had used in conjunction with the first a.c. set. The noise was not there, but as soon as I connected it to the detector it would reappear. So there I was; the two segments were quiet, but put them together and the little demon would appear. I then started anew, carefully shielding every detail and proceeding with caution, but all to no avail; the noise persisted. I tried by-pass condensers everywhere I could possibly put them. I almost gave up the idea of ever having a successful a.c. receiver. Then I found that my trouble was really coming from the line even though it did not show itself readily there. I tried the most unusual types of line filters, but they were only partially successful.

"I gave this up and after trying everything under the sun I found the only thing that would totally eliminate it — a single 1- μ fd. by-pass condenser connected from one side of the 2.5-volt a.c. filament leads to the receiver shield. The odd part of it is that the noise is not eliminated if the condenser is connected to the grounded center-tap of the filament transformer, but only when connected to the receiver shield."

It is possible that the lack of success when the condenser is connected to any other grounded part of the set except the shield is caused by some local condition in the receiver itself. A good many of the measures taken by some experimenters to get satisfactory operation do not seem quite logical, but after a few days of sweating over a humpy receiver one is ready to try almost anything, logical or not!

The Hudson Division Convention

WITH expression on every hand of the "best convention ever held," the fifth annual convention of the Hudson Division came to a close late Saturday, May 24th.

From the very beginning when Dr. A. L. Walsh, Director of the Division, greeted the delegates and speakers, until the closing event, every minute was taken up with interesting subjects. Mr. Heller of the Insuline Products had a wonderful exhibit of television apparatus; Mr. D. E. Replogle of Television Corporation gave a fine lecture on "Television for the Amateurs," and those listening to him realized what progress has been made in that particular field. It seemed good to see so many old-timers present renewing ac-

quaintances and with the young amateurs taking part in the stunts so well managed by C. E. Sergeant, W2BCA. The interest and stunts between some of the lectures was a good thing and helped to keep the audience together. A. A. Hebert of A.R.R.L. spoke on legislation and the new regulations, emphasizing the importance of keeping within the amateur frequencies. One of the surprise speakers was David Grimes, formerly a radio consultant but now with the R.C.A., who gave a most interesting lecture on "Short Wave Radio Receivers," and if the number of questions asked afterwards was any criterion of the interest the speaker should feel gratified.

George Grammer, Assistant Technical Editor, QST, made his formal appearance as a speaker and covered the ground very thoroughly on the subject, "Avoiding Interference with Broadcast Receivers and Other Radio Services," being the concluding lecture Friday evening, but every one seemed loath to disperse and groups were seen here and there "hamfeeting" until late into the night.

With the weather much cooler on Saturday, the afternoon session started practically on time with A. O'Hara, W2OG, in charge. Clark C. Rodimon, Managing Editor, QST, was the first speaker and gave a very good demonstration on how QST is printed and the trials and tribulations of an editor before the magazine is ready for distribution. Mr. George Fleming, one of the engineers of Loftin-White Co., spoke convincingly on "Amplifiers," being followed by Chief Radioman Pomranz, U.S.N.R., who discussed naval reserve and the advantages of enrolling.

The big event of Hudson Division conventions is always the banquet, and this year Frank Frimmerman, W2FZ, outshone all previous affairs with one of the finest dinners with dance music by Ed Berlin's Orchestra between courses. As there were more YL's and OW's present this year, this feature of the dinner was enjoyed by a large number. Several professional entertainers kept up the interest with songs and specialty dances, one of which was extremely interesting because of the fact that the performer was one of our "hams" — none other than Eddie Green (W2AKM) of the R-K-O vaudeville circuit, presenting his comedy act, "Sending a Wire." The speakers of the evening were Director Walsh, former Director Larry J. Dunn, Col. J. B. Allison for the U. S. Army; Capt. Overstreet of the Navy, who recounted his experience when the Battleship *Oregon* made her eventful trip at the beginning of the Spanish-American War, and radio was unknown in those days. A. A. Hebert, A.R.R.L., and last but not least, G. E. Mears, W2VQ, who in a humorous skit presented his "1935 Transmitter." The Long Island City, Bronx, Brooklyn and Bloomfield Radio Clubs were present with large attendance.

(Continued on page 82)

W9ANZ

A Pioneer 14-Mc. 'Phone Station

W9ANZ, owned by Louis F. Leuck, 1718 So. 14th Street, Lincoln, Nebraska, was one of the first stations¹ to use 'phone on the 14,000-ke. band when it was first opened for that purpose three years ago. Even after the privilege was rescinded, Mr. Leuck was so certain that the band would once more be opened for amateur telephony that the modulator unit was allowed to remain unmolested on the operating table and ready to go at a moment's notice, although telephony was not used in any other band. In the interim the set was used for c.w. on the 7000- and 14,000-ke. bands, although now used largely for 'phone on 14,000 kc. since the adoption of the present regulations some months ago.

The transmitter at W9ANZ is crystal-controlled, as most of the best of the present-day amateur 'phone stations are. In fact, as many amateurs have found from experience, crystal control is a practical necessity if the transmitter is to be really suitable for 'phone work, particularly on the 14,000-ke. band.

Digressing for a moment, W9ANZ had his first taste of amateur radio back in 1912, with an E. I. Co. receiver and an old ignition coil. This qualifies him without doubt for a place in the roster of old timers — anyone who cut his teeth on the old E. I. Co. catalog is eligible!

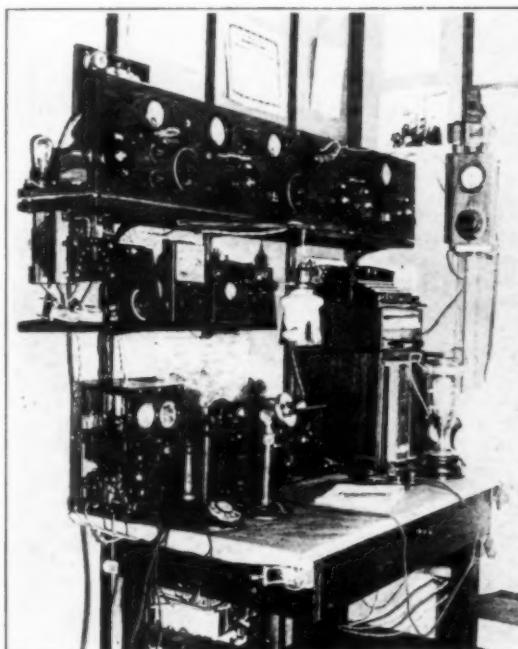
During the war he made his acquaintance with c.w. and telephony while serving in the Signal Corps, and opened up in 1922 under the present call with a 5-watt tube. Since that time the original outfit has been greatly enlarged upon.

One of the photographs shows a view of the station, which is located in a sun room on the second floor. W9ANZ says that there are at least four kinds of electromagnetic waves making their home in the operating room — sunlight, heat in summer, power QRM from three different power companies, and radio waves. The transmitter is on the top shelf above the table, and consists of two units, which will be taken up in more detail later. The lower shelf holds three frequency meters of various types, one of them a heterodyne meter. The filament transformer for the transmitting tubes is suspended to the left of them from the upper shelf. On the table itself are the modulator, the receiver, the microphone for the set, and the wire

'phone. The power supply equipment is in a separate room.

THE TRANSMITTER

The transmitter was originally built as a 7000-ke. crystal-controlled outfit, and an addition was made to allow it to be used on either 7000 or 14,000 kc. The two units are shown in separate photographs. The fundamental frequency of the crystal used is 1763 kc.



W9ANZ

The c.w. portion of the transmitter is on the top shelf, the antenna tuning condenser, loading coil and ammeter being mounted on the wall at the right. The lower shelf holds the frequency meters. A pair of plug-in coils for the receiver are also on this shelf. On the operating table, from left to right, are the modulator unit, receiver, and a cabinet containing cards, station log, etc. The cup was won by W9ANZ during the Nebraska Week competition in 1927. Under the table are the batteries for both transmitter and receiver.

A diagram of the c.w. portion of the transmitter is shown in Fig. 1. A Type '12 tube is used in the crystal oscillator, and is followed by a pair of Type '10's as frequency doublers. Two are necessary to reach 7000 kc., because the crystal is cut for the 1750-ke. band. A double tank is used in the plate circuit of the crystal tube, one tuned to the crystal frequency, the other to twice that

frequency. The output of the second tank is fed into an amplifier working on the same frequency and consequently this tube must be neutralized. The output of this amplifier furnishes the excitation for the 7000-ke. doubler, which in turn feeds

Type '03-A. When the set is to be used on 14,000 kc. this switch connects the 7000-ke. doubler output to the grid of the 14,000-ke. doubler, which is a Type '10, the output of which excites the power amplifier on the same frequency. The

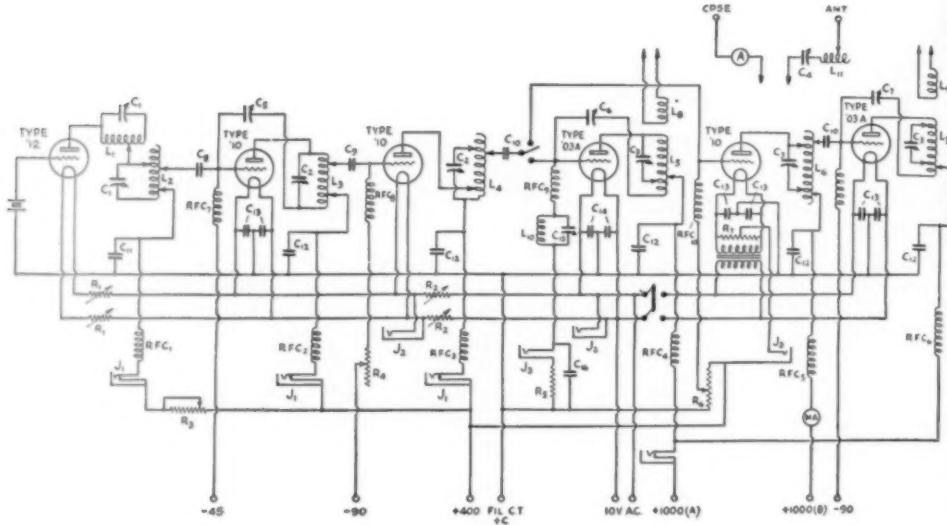


FIG. 1.—THE C.W. PORTION OF THE TRANSMITTER

- C₁—350- μ fd. variable.
- C₂—Double-spaced variable of approximately 50- μ fd. maximum capacity.
- C₃—Double-spaced variable with approximately 100- μ fd. maximum capacity.
- C₄—250- μ fd. variable.
- C₅—12-plate midget.
- C₆—12-plate midget immersed in oil.
- C₇—Double-spaced Cardwell cut down to 6 plates
- C₈—250 μ fd.
- C₉—100 μ fd.
- C₁₀—50 μ fd.
- C₁₁—5000 μ fd.
- C₁₂—2000 μ fd.
- C₁₃—6000 μ fd.
- C₁₄—4000 μ fd.
- C₁₅—60- μ fd. midget.
- C₁₆—1 μ fd.
- L₁—32 turns of No. 18 wire wound into coil 2 $\frac{1}{2}$ " dia., 3 $\frac{1}{2}$ " long.
- L₂—21 turns of No. 16 wire wound into coil 2 $\frac{1}{2}$ " dia., 2 $\frac{1}{2}$ " long.
- L₃—29 turns of No. 16 wire wound into coil 2 $\frac{1}{2}$ " dia., 3 $\frac{1}{2}$ " long.
- L₄—14 turns of No. 14 wire wound into coil 2 $\frac{1}{2}$ " dia., 2 $\frac{1}{2}$ " long.
- L₅—11 turns of $\frac{1}{4}$ " tubing wound into coil 4 $\frac{1}{2}$ " dia., 5 $\frac{1}{2}$ " long.
- L₆—7 turns of $\frac{3}{16}$ " tubing wound into coil 2 $\frac{1}{2}$ " dia., 2 $\frac{1}{2}$ " long.

either a Type '03-A or a 14,000-ke. doubler, depending on the band being used.

For 7000-ke. work the antenna and counterpoise leads are clipped on L_6 , in which case the switch in the output lead from the 7000-ke. doubler is thrown to connect to the grid of the

- L₇—7 turns of $\frac{1}{4}$ " tubing wound into coil 2 $\frac{1}{2}$ " dia., 2 $\frac{1}{2}$ " long.
- L₈—R.E.L. transmitting inductance.
- L₉—10 turns of $\frac{3}{16}$ " tubing wound into coil 2" dia., 2 $\frac{1}{2}$ " long.
- L₁₀—Enough turns of No. 18 d.c.c. wire on a 1" tube to tune to 7050 kc. in conjunction with C₁₄.
- L₁₁—5 turns of No. 14 wire wound into coil 4" dia., 1 $\frac{1}{2}$ " long.
- R₁—10-ohm rheostat.
- R₂—5-ohm "
- R₃—10,000-ohm variable resistor.
- R₄—100,000-ohm "
- R₅—9000 ohms.
- R₆—100,000-ohm variable resistor.
- R₇—100 ohms, center-tapped.
- RFC₁—1 $\frac{1}{2}$ " long by $\frac{3}{4}$ " dia., wound with No. 30 d.c.c.
- RFC₂—2 $\frac{1}{2}$ " " " $\frac{3}{4}$ " " " " " " "
- RFC₃—3 $\frac{1}{2}$ " " " $\frac{3}{4}$ " " " " " " "
- RFC₄—1 $\frac{1}{2}$ " " " $\frac{3}{4}$ " " " " " " "
- RFC₅—1" " " $\frac{1}{4}$ " " " " " " "
- RFC₆—1" " " $\frac{1}{2}$ " " " " " " "
- RFC₇—6" " " $\frac{3}{4}$ " " " " " " "
- RFC₈—4" " " $\frac{3}{4}$ " " " " " " "
- RFC₉—5" " " $\frac{1}{2}$ " " " " " " "
- RFC₁₀—1" " " $\frac{3}{4}$ " " " " " " "
- RFC₁₁—1" " " $\frac{3}{4}$ " " " " " " "
- J₁—Closed-circuit jack for milliammeter plug.
- J₂—Open-circuit jack for filament voltmeter plug.
- J₃—Open-circuit jack for key plug.

antenna and counterpoise are also shifted to L_9 . The same '03-A is used in each case, simply being placed in the proper socket for either 7000- or 14,000-ke. work.

It will be noted that the output tube always works on the same frequency as the tube exciting

it. Neutralization of the output tube is therefore required, but it was early found in the experiments with crystal control at W9ANZ that the output was much higher when the power amplifier was excited on its operating frequency than when used as a doubler — a conclusion which has been checked by many other experimenters. Efficiency and power output both increase when plenty of excitation is available.

The plate voltage for the 14,000-ke. doubler is

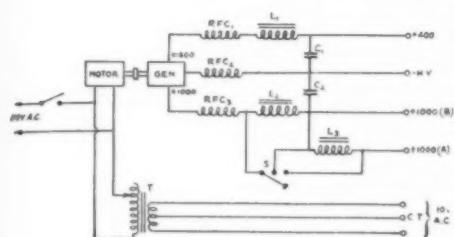


FIG. 2.—POWER SUPPLY

obtained in a rather unusual manner. A 200-watt Esco generator furnishes plate power for the transmitter, and is a double-commutator machine, 400 volts being taken off one commutator and 1000 from the other. The entire winding is rated at 200 milliamperes. When the 7000-kc. section of the transmitter is running, the oscillator and doublers take about 90 m.a., while the '03-A takes 125 m.a. The total load on the 400-volt part of the winding is thus 215 milliamperes, which is an overload small enough to be carried without difficulty. However, the addition of another tube would exceed the safe limit, so the part of the generator winding between the commutators, which on 7000 kc. only carries the current required by the '03-A, is used, by the simple expedient of making the 400-volt commutator the *negative* terminal for this one tube, the 1000-volt tap being connected to the plate. This requires the use of a separate filament transformer, which in this case is a special one working from the 10-volt filament supply to the '03-A tube, and drops the voltage down to 7.5 for the Type '10 doubler. The windings must of course be insulated for the full plate voltage. A 100,000-ohm resistor, provided with a sliding contact, is connected across the 400-volt part of the machine, and furnishes

variable "C" bias for the 14,000-kc. doubler also.

The plate supply generator and its driving motor are mounted on a wood base which is suspended by four screen-door springs, one at each of the four corners of the base. A home-made coupling, made of heavy hose, connects the shafts of the two machines. The coupling and method of mounting have completely eliminated chattering and vibration. A separate filter is provided for the 400-volt supply, in addition to the 100-volt filter.

The main filament transformer is a special job with excellent characteristics. It will handle 160 watts continuously, and the efficiency at full load is 90%, while the regulation is only 5%. The low regulation is very much of an advantage with this transmitter, because the small voltage changes when the load varies makes it possible to switch the modulator tube filament on and off without necessitating a readjustment of the voltage on the other tubes. The other primary of the transformer is tapped to allow adjustment of the secondary voltage.

All the transmitting tubes with the single exception of the 14,000-kc. doubler are lighted from the same filament transformer. A pair of variable resistors is connected between the '03-A's and the two '10's in the 7000-kc. portion of the transmitter, dropping the voltage to 7.5 for these tubes. Further resistors are used to drop the voltage to 5 volts for the filament of the Type '12A's.

Bias for the oscillator and first two doublers is supplied by a combination of batteries and resistors. The exact arrangement is shown in Fig. 1. Bias for the '03-A when used as a 7000-*kc*. ampli-



THE 7050-KC, PART OF THE TRANSMITTER

The oscillator tube is on the right, followed by the two Type '10 doublers and the '03-A amplifier. The tuned choke mentioned in the text is in the tube shield just to the left of the second doubler.

fier is furnished by the drop through the 9000-ohm resistor in series with the key jack. The method of obtaining bias for the 14,000-ke. doubler has already been explained.

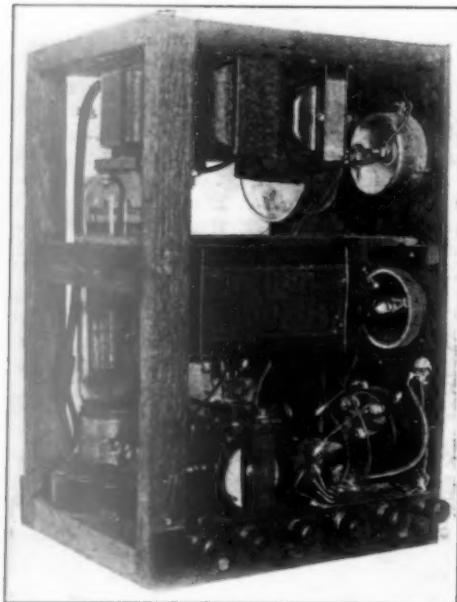
Two different keying arrangements are in use, one for each band. When operating on 7000 kc, keying is in the grid circuit of the power amplifier, and the key is shunted by the grid leak and a 1- μ f. condenser in series. This system gives almost clickless keying even when the receiver is operated on the same frequency as the transmitter, and completely eliminates all BCL.

troubles.² A trap tuned to the operating frequency is placed in the lead from the grid to the key, in addition to the usual form of r.f. choke.

On 14,000 kc. the key is placed in the lead from the filament center-tap of the doubler tube to the positive side of the 400-volt supply. This corresponds to ordinary center-tap keying. The bias on the output amplifier is sufficient to reduce its plate current to zero when the key is up and excitation is removed. With this keying method no back wave is emitted and key clicks are negligible.

MODULATION

The modulation system at W9ANZ is the improved Heising arrangement in which the modulator tube is operated at a higher plate voltage



SPEECH AMPLIFIER AND MODULATOR

The home-made microphone transformer is just behind the variable resistor on the near side of the panel. Some of the impedances mentioned in the text can also be picked out in this photograph.

than the modulated amplifier. The modulator differs from the more common system used to obtain a high percentage of modulation, however, because a voltage booster is used instead of a dropping resistor.

Several advantages result from this. No power is wasted in a dropping resistor, for one thing, and the r.f. tube is operated at the same plate voltage for both e.w. and 'phone without the necessity of changing connections. The '03-A is operated at 1000 volts, the nominal rating, in both cases.

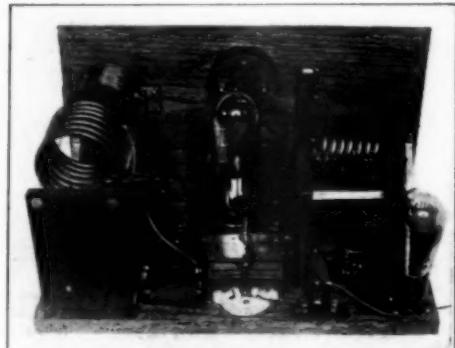
The voltage booster is a power pack which fur-

² An explanation of this system is given on page 46, *QST* for August, 1929.

nishes 300 volts at about 75 milliamperes. The output of this power pack is connected in series with the plate supply generator, making a total of 1300 volts available for the modulator tube. The booster employs a transformer and Type '80 rectifier, with the filter shown in Fig. 3. Since the negative side of the booster power supply is at 1000 volts potential above ground, the insulation of the transformer must be sufficient to stand the full plate voltage. A further consideration in the design of this particular transformer is that the capacity between the primary and secondary windings must be low in order that voice frequencies will not be by-passed to ground during modulation; for this reason the two coils are wound on separate legs of the core. The filament winding for the '80 rectifier is small and its capacity to the primary is negligible; therefore this winding is put on the same leg as the primary.

The modulator tube is a UV-211, which gives good results when working into the load furnished by a Type '03-A, and is more suitable than another '03-A would be for this purpose. Since the transmitter was built other types of tubes have been made available for modulation purposes, but the results with the present layout have been so satisfactory that the old tubes have been retained.

A Type '40-high- μ tube is used in the speech amplifier, and has given very good service. It is impedance-coupled to the modulator tube through a combination of inductances which has been used for a very definite purpose — namely,



THE 14,000-KC. DOUBLER AND AMPLIFIER

A Type '10 is used as a doubler and a Type '03-A as power amplifier. The neutralizing condenser is in the center foreground.

to obtain high inductance without at the same time increasing the distributed capacity, which is always troublesome when a single high-inductance coil is used, and is likely to cause a resonant condition in the voice range which will result in bad distortion.

A 30-henry choke and the secondaries of two audio transformers are connected in series in the

plate circuit of the speech amplifier tube. The audio transformers are rated to carry 10 milliamperes in their primaries, and since the transformation ratio of both is 3 to 1, it was judged that the secondaries would carry 3 mils without difficulty. The actual plate current is 2 to 2½ mils and the transformers have carried this without any sign of burning up. The primaries of the transformers are left unused to avoid saturation of the core from the d.c. plate current. The plate voltage on the Type '40 is 370 and, surprising as it may seem, the tube handles it nicely.

The coupling condenser between the speech amplifier and modulator is a 1-μfd., 1000-volt condenser. The impedances in the grid circuit of the modulator are also audio transformers, but in this case both primaries and secondaries are used, since there is no d.c. flowing and consequently no danger of core saturation.

The microphone is constructed from parts of three different mikes. The button was taken from an aeroplane microphone, the carbon granules from a desk-type mike, and the remainder of the parts from still another desk mike. Before assembling, the button and granules were thoroughly cleaned with carbon tetrachloride. This composite microphone has given very good results; it is a great deal like an aeroplane mike in that it picks up very little background noise, and is sufficiently sensitive in conjunction with the speech amplifier, since the modulator tube can be easily worked to full output.

The modulation transformer was home-constructed by utilizing parts from an old Ford coil. The core was sawed in half, and 250 turns of No. 26 wire wound on it. One of the secondary coils from the Ford coil was slipped on top of this winding and serves as the secondary.

A trap tuned to the operating frequency is placed in one of the filament leads to the modulator tube to prevent radio-frequency feedback into the modulating system. When this trap is correctly tuned there is a noticeable decrease in the plate current taken by both the modulator and speech amplifier, proving that some r.f. gets back.

ANTENNAS

By means of three antennas of different lengths it is possible to get a number of combinations for work in any amateur band. One is 15 feet long, one is 45 feet, and the third is a two-wire flat-top antenna 75 feet long. Ordinarily the second harmonic is used for 7000-ke. work, and the fourth harmonic for 14,000 ke.

THE RECEIVER

A diagram of the receiver is shown in Fig. 4. The set uses a Type '01-A regenerative detector, a Type '40 in the first audio stage, and another '01-A second audio. Impedance coupling is used between the first and second audio stages.

The regeneration control is a variable resistor in series with the detector plate battery. In addition to the usual r.f. by-pass between the battery

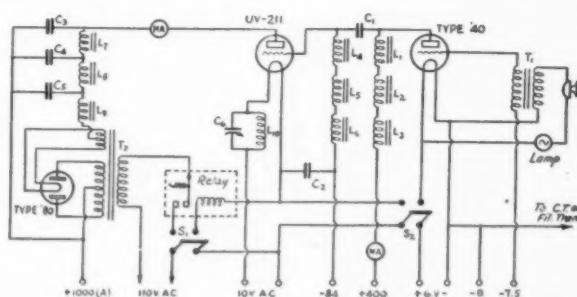


FIG. 3.—SPEECH AMPLIFIER, MODULATOR, AND VOLTAGE BOOSTER

L₁-8—Coupling impedances. See text for description.

L₁—15-henry filter choke.

L₂—13-henry " "

L₃—13-henry " "

L₁₀—Enough turns of No. 18 d.c.c. wire on 1" tube to tune to 14,100 kc. in conjunction with *C₆*.

C₁—1 μfd. 1000-volt condenser.

C₂—1 μfd.

C₃—3 μfd.

C₄—2 μfd.

C₅—2 μfd.

C₆—50-μμfd. midget.

T₁—Microphone transformer. See text for description.

T₂—Power transformer for voltage booster. 500 volts each side of center-tap on high-voltage winding. This transformer must be insulated for full plate voltage between primary and secondary.

S₁-2—D.P.S.T. switches.

The milliammeter in the plate circuit of the speech amplifier reads 0-10; that in the late circuit of the modulator, 0-150.

side of the tickler and the filament, a variable condenser is placed in parallel with this by-pass condenser and serves as a vernier tuning condenser or beat-note control. A pure d.c. signal occupies about 25 degrees on this condenser dial. The grid tuning condenser is in series with a small fixed capacity for band-spreading, and the fixed condenser may be short-circuited by a small switch to increase the tuning range.

The Type '40 tube in the first audio stage lends itself well to peaked audio amplification, and a tuned impedance is therefore included in its plate circuit, in series with an audio-frequency choke which serves as a coupling for straight audio amplification. By means of a two-point switch, either impedance may be short-circuited, thus selecting either peaked or quality amplification. The tuned impedance peaks at 770 cycles, and when in use a pure d.c. signal occupies only about two-thirds the space on the tuning dial that it does with the straight amplification.

THE FREQUENCY METER

Fig. 5 is the diagram of the heterodyne frequency meter. This meter is calibrated from standard-frequency transmissions, and covers the range from 6600 to 7600 kc. All batteries are con-

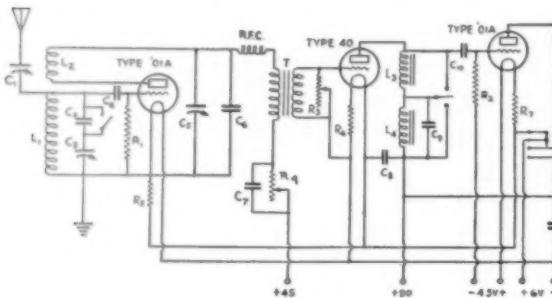


FIG. 4.—THE RECEIVER

C₁—5-plate midget.
 C₂—50 μ fd.
 C₃—Cardwell condenser cut down to 2 plates.
 C₄—150 μ fd.
 C₅—350 μ fd.
 C₆—500 μ fd.
 C₇—2 μ fd.
 C₈—1 μ fd.
 C₉—.01 μ fd.
 C₁₀—6000 μ fd.
 L₁₋₂—Homemade plug-in coils adjusted for various amateur bands.

L₂—Ford secondary coil. Inside space is filled with core wire.
 L₄—Ford secondary coil—core removed.
 R₁—10 megohms.
 R₂—4 megohms.
 R₃—0-1 megohm variable resistor.
 R₄—100,000-ohm " "
 R₅—30 ohms.
 R₆—4 ohms.
 R₇—4 ohms.
 T—Audio transformer.
 J—Filament control jack.

tained in the box, and a filament voltmeter is incorporated for adjusting the filament voltage to the correct value. The tube is a Type '99.

W9ANZ did not mention the other frequency meters shown in the station photograph, but from their appearance it is probable that they are of the absorption type.

OPERATION

The various filament voltages and plate currents are measured with the same meters wherever possible by utilizing plugs and jacks. The exact arrangement of the jacks and the various meters is shown in the diagrams of the transmitter.

Shifting from one band to another can be accomplished in a few minutes. It is simply necessary to place the '03-A in the proper socket, transfer the antenna clip from one pick-up coil to the other, tune the antenna condensers to predetermined settings, transfer the output of the 7000-ke. doubler to either the 14,000-ke. doubler or the 7000-ke. output stage as the case may be, and set the tank condenser of the 7000-ke. doubler to a marked value. The key is, of course, plugged in the proper jack at the same time.

When changing from 14,000-ke. 'phone to c.w. the switch S, Fig. 2, is closed, thereby short-circuiting the modulation choke and the filter choke; S₂ in the modulator diagram is then

opened, removing the filament voltage from the speech amplifier and modulator, and at the same time causing a relay in the power-supply equipment to open and disconnect the primary of the voltage-booster transformer, which in effect

opens the plate circuit of the modulator and removes it from the circuit. The relay for this purpose is constructed from an old 150-ohm telegraph relay. The coils were connected in parallel instead of series, and it was found that 10 volts a.c. was sufficient to operate the relay satisfactorily. The relay coils are connected across the modulator filament switch, and when the switch is closed the relay is not energized, the contacts being closed in this case. When the switch is open the full 10 volts is across the relay, as the impedance of the modulator tube filament is negligible compared to that of the relay, and the contacts open.

W9ANZ hardly needs to be introduced to anyone who does any listening on the 14,000-ke. band. When conditions are favorable, it is possible to hold perfectly satisfactory QSO's with both coasts and Canada. Reports of "perfect modulation," "perfect reception," and "100% readable" have been received 75% of the time, even through QRM.

Up to the time of this writing contact has been made with 25 foreign countries on c.w., and the 14-ke. 'phone has been heard in Brazil,

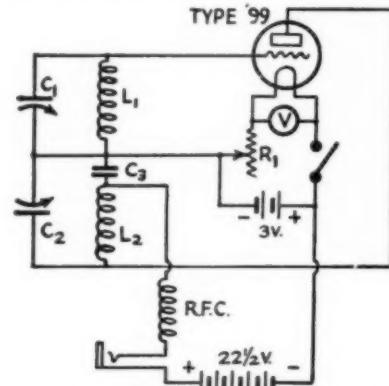


FIG. 5.—THE HETERODYNE FREQUENCY METER

L₁—14 turns of No. 22 d.c.c. on tube base.
 L₂—Same as L₁.
 C₁₋₂—Two-gang condenser with 5 plates, double-spaced, in each section.
 C₂—2000 μ fd.
 R₁—60-ohm rheostat.

Mexico, Chile, Peru, England, Prince Edward Island, Mexico and Spain. 'Phone QSO's have been established with some of these.

(Continued on page 86)

I.A.R.U. NEWS

Devoted to the interests and activities of the

INTERNATIONAL AMATEUR RADIO UNION

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Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society:

THE AMERICAN RADIO RELAY LEAGUE, Hartford, Conn.

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Nederlandse Vereeniging voor Internationaal Radio-

amatourisme

New Zealand Association of Radio Transmitters

Norwegian Radio Relay League

Radio Society of Great Britain

Reseau Belge

Reseau Emetteurs Francais

South African Radio Relay League

Wireless Institute of Australia

Conducted by Clinton B. De Soto

WE are becoming overwhelmed with the increasing preponderance of 28-mc. material in the individual reports that are sent into this department as especial contributions, along with WAC Club applications, and hidden in other and more general correspondence. These individualistic, personal reports are greatly appreciated, and many times result in valuable and interesting items. But lately they have concerned themselves with little but 28-mc. stuff, and inasmuch as there are other places in QST where a special department on international tenu- meter work would be more fitting, we can make no further acknowledgment or use of them than this general expression to all contributors.

A study of the material received brings out some most interesting points. 28-mc. work is more and more becoming a de-nationalized and international affair. The use of this band for practical communication purposes is now found to exist chiefly in those countries where general traffic handling is prohibited or limited. Whereas in the less restricted areas experimental and developmental work on this band is confined to certain experimentally inclined persons possessing necessary talent and equipment, and who in most cases make use of the better developed and more familiar bands for ordinary communication, a lot of amateurs in those unfortunate places where undue governmental restraint is exercised use the 28-mc. band exclusively for all their communication. And they are getting a very fair share of DX QSO's too.

This leaves us in a position to ask, who is going to be the first to achieve a special 28-mc. WAC Club membership? We obviously cannot institute many different grades and classes of membership in the WAC Club, and must normally con-



LOCAL MEETING OF THE RESEAU BELGE, MAY 2, 1930

W3AVK is in the middle, near ON4FM, who is in the golf breeches. Between the two Catholic priests is ON4BZ, the Namur District Manager (where the meeting was held). Paul de Neck, ON4UU, is at the extreme right, and ON4PJ at the extreme left.

tent ourselves with the single exception of the WAC for 'phone, but if it will add a little incentive to this work we will be happy to honor the first application received for WAC for 28-mc. as a special and extraordinary event. How long will we have to wait?

Continuing with the WAC Club, the second WAC for 'phone certificate was issued to Hilton L. O'Heffernan, G5BY. He considers himself doubly honored in that his is the first such certi-

ficate to be issued to a British station. The last confirmatory QSO occurred April 19, 1930.

The QSL Forwarding Bureaus maintained by the amateur organizations of the world are a system mutually co-operative, performing a great service, and productive of much good to amateur radio in general. Linking units are found in every recognized continental area, and in nearly all the important countries permitting amateur two-way communication. The work they do is worthy of praise and heartfelt thanks.

Spots on the globe still remain where amateurs are found in comparatively large numbers, and it is in reaching the new and unlisted stations in these places by mail that difficulty is experienced. This is a request to amateurs residing in such localities to do themselves and their fellow amateurs a great service by volunteering to receive and forward wherever possible communications intended for stations in their areas. May we have volunteers for this service? All present forwarding agencies have been listed in *QST*.

BELGIAN SECTION

By Paul de Neck, President of the Reseau Belge

Apart from the habitual European contracts, and some good DX on the 7-mc. band, the principal activity is found near 43 meters where all our 'phone hams assemble and hold long conversations with Spain, France, Italy and North Africa.

Two good records in low-power 'phone work are recorded: ON4WY, with 16 watts in a push-pull circuit and choke modulation, was in contact with PY1AN of Rio de Janeiro on 42 meters. His modulated signal was received R5. ON4QS with only five watts was heard R7 on 52 meters by EAR20.

On the 14-mc. band DX is always good with the exception of some dead spots where none but European stations are received.

Our friend ON4BU is now working from Kalina, near Leopoldville, in the Belgian Congo, with the call letters ON4CAA and about 100 watts input on 14,030 kc. His first contact was with W1BUX QRK R8! The next was W4MK, who received him R4. Afterward the following Belgian amateurs were worked: ON4JC, ON4UU, ON4RO, ON4FP, ON4WW and ON4ZZ.

ON4JC in one glorious day worked the following DX: ZT2B (R6), FB8PHI (R8) of Madagascar, FO9SR (R7) and VS6AF (R5) of Hongkong. All contacts were made with 20 watts input, a Zeppelin type antenna, and took place in the period from 1800 to 2000 G.C.T.

After midnight (2400 G. C. T.) the Japanese stations J3CR, J3CF and J3FR are now heard full strength.

On the 28-mc. band nothing has been done yet, but several Belgian hams are preparing their sets for the June tests.

Sunday, May 4th, we had the pleasure of a visit from a good U. S. ham, W3AVK of Philadelphia, Pa., who together with several Frenchies came to a local meeting we held in Ciney (Namur district).

DUTCH SECTION

By W. Keeman, Traffic Manager N.V.I.R.

Reception generally has been poor this month. In most cases, however, those stations which were heard were easily worked. On the 14-mc. band conditions for VK and ZL communication were far worse than last month. During the night South Africa comes in regularly with good strength, and most countries of this continent have been worked by our membership.

Good "W" conditions existed on May 1st, 2nd and 3rd. On the other nights practically no "W" signals came through. The writer notices that during the last half year "W's" could be worked during short periods of a few days, separated by intervals of about 26 days (one revolution of the sun). In easterly directions only a few outstanding contacts have been made, but still several new Dutch stations have worked their PK countrymen, while PAΦZF worked China. On May 3rd PAΦDW, our well-known DX-station, worked all continents; PAΦQF established this record some time ago. On 28-mc. the first PA-W contact was made by PAΦQQ on May 16th. As to DX, 7-mc. was a complete washout.

The news that the British Postmaster-General had opened the 3.5-mc. band to the English amateurs was received here with great satisfaction. Practically no difficulty now remains to prevent the I.A.R.U. from putting into action the uniform regulations for the use of the several bands, as proposed by our traffic department about two years ago and brought to the attention of I.A.R.U. Headquarters by the R. E. F. The general complaint of hams working in the 3.5-mc. band is the small number of foreign stations working there. Still PAΦQQ reported several good contacts, his best DX being Petrograd in Russia. Much trouble is caused by several commercials working inside our bands, i.e., FYA, FYZ, PPX, PLJ, RKV, RVA and IDO. PPX has even announced himself as being on 43 meters while actually working on 7,180 kc. A beginner hearing such an announcement and considering it correct, would regard it as a standard, thereby resulting in off-wave operation, interference with official traffic and a complaint to the Berne Bureau protesting against "those amateurs" working outside their bands, thus risking further restriction at Madrid.

When RKV and RVA are both working, the greatest part of the 14-mc. band is covered with their broad r.a.c. or super-regenerative signals, backwaves and clicks. If possible something ought to be done about this matter. As no traffic

(Continued on page 78)

The Communications Department

F. E. Handy, Communications Manager
 E. L. Battey, Asst. Coms. Mgr.
 1711 Park St., Hartford, Conn.



The Springfield Air Races

The dedication of the new Bowles Airport at Springfield, Mass., was the occasion of the Springfield Air Races held on May 30th, 31st and June 1st. The Springfield Radio Association had been approached a few weeks prior to those dates to furnish radiophone communication between the pylons and the timing stand for the purpose of reporting the progress of the planes around the course, and for checking them to see that they did not "cut off" at the turns. As usual, the amateurs were not found wanting and at the start of the races the stations which we shall describe in the following paragraph were in operation.

The control station, located at the Timer's Stand (Pylon No. 1) used the call W1OF. This station used a combined transmitter and receiver with the tuned plate-tuned grid circuit. Cushing, W1AWW, was operator at W1OF. Station W1DE was located at Pylon No. 2 with W1BVR, W1BSJ, W1BSN and W1CCH as operators. The equipment at W1DE consisted of a portable transmitter-receiver owned by W1WP; the transmitter being a 15-watt affair using grid modulation, 540 volts of "B" batteries feeding the tubes and .6 ampere going into the antenna. A frequency of 3510-ke. was chosen for W1DE. At Pylon No. 3 was station W1AWW, operated by W1DR, W1BSN, W1BVR and W1CCH. The outfit at W1AWW was a Baby Burgess split Colpitts 7½ watt transmitter with storage battery filament supply and 450 volts "B" batteries on the plate. Loop modulation was used on approximately 3505-ke. The receiver was a three tube job using Pilot coils.

The pylons were made of wood and were about thirty feet in height, shaped like pyramids. Four by four timber was used with boards nailed across lattice-like. Each pylon was covered with black and yellow bunting and had a checked flag at the top of the mast. At each pylon a tent was put up to house the station assigned at that point. Special tables had to be constructed in the tents to hold the equipment.

The first day of the race cooperation, Friday, May 30th, found all the stations in readiness. The weather was cold, raw and very windy. W1DE and W1AWW contacted W1OF at the Timer's Stand every fifteen minutes. Races were reported at 4 p.m. On May 31st three races were reported. W1OF, the control station, would announce when the planes had left on a race and then stand by for reports from Pylon No. 2. As the planes went by Pylon No. 2, W1DE would call out the numbers of the planes passing okay. Reception was so good that the roar of the motors as the planes passed the pylons could be heard at the Timer's Stand. After the planes had passed Pylon No. 2, W1AWW would begin reporting them as they passed Pylon No. 3, calling off the numbers of the planes passing. After this W1OF would O.K. the reports received. Four races were reported on Sunday, June 1st.

In addition to the regular reporting of the races several other interesting things happened during the three days at the Field. The *New Arbeila*, KHIJQ, the Boston *Herald* good will plane, visited the field and arrangements were made to work KHIJQ in the air. Contact was made without difficulty and after the ability of receiving the plane had been demonstrated the mike was turned over to the regular an-

nouncer on the ship and the receiver was in turn plugged through the loud speaker system at the airport. The announcer on the *Arbeila* talked to the audience for about fifteen minutes while flying 3000 feet above the ground.

The wind became so strong on the last day of the races that Pylon No. 3 was blown down. As the antenna-counterpoise system of W1AWW was fastened to the pylon, it also came down and rested on the ground. W1AWW still got through but reports were very weak. This condition did not last very long, however, as two of the operators immediately went out to correct the situation, one holding the antenna up with a pole and the other the counterpoise. You can't stop a ham! Hi.

All in all the Springfield Radio Association's cooperation at the Air Races was a decided success. Each member took a personal interest in the work, and the resulting spirit of unity has tended to make the SRA 100% stronger.

The above report is furnished through the courtesy of T. F. Cushing, W1AWW, Percy C. Noble, W1BVR and Harry Fisk, W1DR. Thanks are due the National Carbon Company, the National Guard, the Wetmore-Savage Electric Supply Company and the B. H. Spinney Company for apparatus and supplies furnished.

DAIV

The schooner yacht *Mopelia* has left New York carrying a party of fifty boys on a two months' cruise through the West Indies. J. Pascal, W2CEV-W9AQD, is radio officer in charge of the 100-watt high frequency installation aboard which will operate under the call DAIV. DAIV is expected to have frequencies adjacent to our 3500-, 7000- and 14000-ke. bands, but the only definite frequency known at the present time is 6667-ke. (45-meters). There will be plenty of traffic and Count von Luckner, owner of the *Mopelia*, is offering a cup to the amateur radio operator who gives the best service in providing communication with the yacht. The cruise offers a splendid opportunity to show what we can do and all amateurs are urged to listen for DAIV on 45-meters and cooperate in every way possible.

Traffic Briefs

Send for the 15th (June, 1930) edition of the Rules and Regulations of the Communications Department. This contains the full text of the new amateur regulations, lists of Q code, international prefixes, information on the qualifications and duties of different officials in the A.R.R.L. field organization, how elections for Section Manager are held, etc. A postal will bring you the latest up-to-date edition of this information for your operating table free of charge. Mail it today.

VE5AW is the first Canadian "five" to work all continents. He also believes he is the second in Canada to do this. FB, OM!

Among the several transcontinental traffic routes now in operation is one running W1KH and W2SF to WSCNO to W9PX to W9EJQ to W9BOQ to W9FAM to W9CAA to W6BCO. A branch of this route connects W9FAM and W6BJF. Most of the stations on the route have numerous other schedules making quite an extensive hook-up.

W6CGM advises that China has lost two good amateur stations. AC3MA has been closed by military authorities and ACSRV shut down permanently when the owner returned to the States.

LONG BEACH AIR MEET

W6DQI of the Associated Radio Amateurs of Long Beach, Calif., sends us the following account of communications furnished by the A.R.A. at the Long Beach Air Meet held at the Long Beach Municipal Airport on May 24th and 25th.

At the regular meeting of the club on May 23rd Hal Nahmens, W6HT, was appointed chief operator, and Foster Strong, W6ELZ, liaison officer. Early Saturday morning all the equipment was in place — a 50 watt M.O.P.A. at the Judge's Stand operated without an antenna; a 7½ watt Ultra Audion at Pylon No. 1 operated with what amounted to a "hunk of wire" for an antenna; a 7½ watt Hartley at Pylon No. 2 using a Zepp antenna and a Ford Coil plate supply; and a 7½ watt T.P.T.G. with a Zepp at Pylon No. 3.

All stations were in working order and had been well tested prior to the first race at 10 a.m. Saturday, May 24th. They were in almost continuous operation all day Saturday and Sunday furnishing communication between the pylons and the Judge's Stand. The operators were as follows: At Judges' Stand W6HT and W6DEP; at Pylon No. 1 W6DYZ and W6EQW; at Pylon No. 2 W6CZZ and W6DYZ; at Pylon No. 3 W6CHW and W6EIP.

The A.R.A. was highly spoken of by Army, Navy and Airport officials for the work of its members at the Long Beach Meet.

Official Broadcasting Stations

CHANGES AND ADDITIONS

W9CFL (3750 kc.) Mon., Wed., Sat., 7:00 to 7:25 p.m.; (7100 kc.) Mon., Wed., Sat., 7:30 to 8:00 p.m.; (3750 kc.) Fri., 9:00 to 9:15 p.m.; (7100 kc.) Fri., 9:20 to 9:35 p.m.

W9DZM-W9EKZ (14200 kc.) cc Daily 10:30 p.m., (7018 kc. ee. or 3509 kc. fone) Mon., Thurs., Sun., 10 p.m. W9ERU (7120 kc.) Tues., Thurs., 7:30 p.m.

W7OV (7275 kc. approx.) Mon., Wed., Fri., 7:00 and 10:00 p.m.

KGEWB (7100 kc. and 14,300 kc.) Wed., Fri., Sun., 5:30 p.m. H.S.T.

W4ALH (7143 kc.) Tues., Thurs., Sat., 7:30 a.m., 8:30 p.m. C.S.T.

W1MK

A.R.R.L. Headquarters' Station W1MK operates on frequencies of 3575 kc. and 7150 kc. Robert B. Parmenter, "RP," is the chief operator; his fist is familiar to most of the amateur fraternity. Occasionally other members of the Headquarters' staff operate at W1MK. Their personal signs may be found in the QRA Section of *QST*.

Throughout the following schedules Eastern Standard Time will be used.

OFFICIAL AND SPECIAL BROADCASTS are sent simultaneously on 3575 kc. and 7150 kc. at the following times: 8:00 p.m.: Sun., Mon., Tues., Thurs., and Fri.

10:00 p.m.: Mon. and Fri.

12:00 p.m. (midnight): Sun., Tues., and Thurs.

GENERAL OPERATION periods have been arranged to allow every one a chance to communicate with A.R.R.L. Headquarters. These general periods have been arranged so that they usually follow an official broadcast. They are listed under the two headings of 3500 kc. and 7000 kc. to indicate whether the watch is devoted to listening on the 80-meter band or to the 40-meter band.

QST

3500 kc.

8:10 p.m. to 9:00 p.m. on Sun., Mon., Tues., Thurs., and Fri.

10:00 p.m. to 11:00 p.m. on Tues. and Thurs. (No OBC sent before these periods)

12:00 p.m. to 1:00 a.m. (or later) on Sunday night (Monday morning).

7000 kc.

10:10 p.m. to 11:00 p.m. on Sun., Mon., and Fri.

12:00 p.m. to 1:00 a.m. on the following nights (actually on the norming of the day following): Mon., Tues., Thurs., and Fri. (Only on Tues., and Thurs. does the OBC precede these periods.)

SCHEDULES are kept with the following stations through any of which traffic will travel expeditely to A.R.R.L. Headquarters, on 3500-ke.: W1ACH, W1APK, W1BXB, W1CTI, W2JF, W2WK, W3BWT, W3CBT, W4PM, W9OX, VE2AC; on 7000-ke.: W6AIX, W6DEP.

The New Arbella—KHIJQ

The seven-passenger monoplane New Arbella left Boston in early April on a tour sponsored by the *Boston Herald* in connection with the 300th Anniversary of the founding of the Massachusetts Bay Colony and the forthcoming American Legion Convention. The plane was equipped with a 100-watt radiophone-c.w. transmitter operating on 3106 kc. (96 meters) with the call KHIJQ. Huddleson, W8DBU, was the operator. Amateurs were requested to listen for and report broadcasts from KHIJQ, and we are here giving a brief account of work reported to us by various amateur:

W9VNA heard 'phone transmissions from KHIJQ for twenty minutes after the plane left Milwaukee and CW until arrival at Madison.

April 26 — W9CPD, St. Paul, heard the plane while flying between St. Paul and Des Moines, Iowa. Strength of signals was between R6 and R9 on both 'phone and CW. W9GHO, Minneapolis, worked KHIJQ for forty-five minutes; reported signals QSA5, R9, p.d.c. ('phone and CW). One message was relayed during this QSO.

April 27 — W9HD worked the Arbella en route to Lincoln, Neb., from Des Moines. QSO was established at 10:03 a.m. C.S.T. when KHIJQ was 7 miles east of W9HD. Strength of signals at that time was QSA5, R9 ('phone). At 10:25 a.m. distance was 25 miles and audibility QSA3, R3 (CW). W9HD says that KHIJQ's signals were marked for their steady frequency and good modulation.

April 28 — The New Arbella arrived at Topeka, Kansas. Arrangements were made with W9FLG to keep a watch on KHIJQ's frequency until they reached Kansas City. Transmissions from the plane were followed until just before it landed in Kansas City and two messages were received by W9FLG, one for the local Legions and one for the Chamber of Commerce. KHIJQ's CW signals were QSA4-5, while the 'phone could not be copied.

May 3 — W9OW heard KHIJQ communicating with W8XK en route from Pittsburgh to Washington, D. C.

May 10 — W1MK worked KHIJQ en route to Hartford from Newark, N. J., and exchanged messages relative to a hook-up with W1TC. W1TC was making plans to rebroadcast transmissions from the Arbella upon its arrival in Hartford. W1AOX and W1CRN heard both sides of the QSO between W1MK and KHIJQ. The New Arbella landed at Hartford. W1AVK arranged schedules with KHIJQ for 10:00 a.m. E.S.T., May 11, when the ship was to leave for Providence.

May 11 — W1AVK and W1CRN in Fall River, Mass., who requested that KHIJQ be informed that he would watch for the Arbella as she neared Providence. KHIJQ got underway at about 11:10 a.m. E.S.T. and called W1AVK. It was found that W1AVK's receiver would not tune to 3106 kc., so station W1AOX was used. W1AOX held a two-way 'phone QSO with KHIJQ until the plane was about fifteen miles away, when W1AOX changed to CW. The plane used 'phone all the way to Providence. Contact was held with W1AOX until they had passed over Providence. W1AOX was then asked to stand by and KHIJQ tuned around to see if other hams were calling. W1CRN was heard and worked. At KHIJQ's request W1AOX sent broadcasts on 'phone and CW to all amateurs telling them of the Arbella's proposed afternoon flight over Rhode Island and Eastern Massachusetts. At 1:40 p.m. W1BXB heard KHIJQ working W1CTC, audibility QSA5, R3 (modulation good). W1BXB heard the plane again QSO W1CRN at 3 p.m., location then over Fall River. At 3:15 p.m. KHIJQ sent a general call for Taunton, Mass., signing off at 6000 ft. receling in antenna and getting ready to land there for one hour. At 5:08 p.m. W1BXB again heard KHIJQ. QSA4, R6, calling W1AHB and saying he was nearing Hyannis, Mass. W1AXY heard KHIJQ while en route from Pawtucket, R. I., to Hyannis, Mass., working W1CRN. W1AXY worked KHIJQ on 'phone all the way from New Bedford to Hyannis. KHIJQ landed at Hyannis.

May 12 — W1AXY was in continuous communication with the plane while flying between Hyannis and Providence, and between Providence and Brockton, Mass. W1AXY handled a rush message to the *Boston Herald*.

May 13 — W1AXY heard the plane leaving Lawrence, Mass., for Lowell. W1AKY and W1WX worked KHIJQ. W1AXY fol-

lowed the broadcasts from the Arbella as far as Manchester, N. H., but could not follow the trip to Concord.

May 14 — KHIJQ left Concord at about 11:30 a.m. E.S.T. and immediately called WIAPK on 'phone, and two-way communication was established. When the plane reached the Maine-N. H. boundary line, WIAPK changed to CW because KHIJQ could not copy his 'phone through the QRM from the plane's engine. KHIJQ and WIAPK were in communication until the plane neared Portland, Maine.

Traffic Summaries

(MAY-JUNE)

Pacific led by Los Angeles.....	8206
Central led by Illinois.....	2886
Atlantic led by Western Pennsylvania.....	2219
New England led by Connecticut.....	1833
Southeastern led by Florida.....	1551
Hudson led by Eastern New York.....	1255
West Gulf led by Northern Texas.....	715
Northwestern led by Montana.....	660
Dakota led by Southern Minnesota.....	655
Midwest led by Missouri.....	570
Roanoke led by Virginia.....	554
Delta led by Tennessee.....	278
Rock Mountain led by Utah-Wyoming.....	166
Quebec.....	94
Ontario.....	53
Vanatta led by British Columbia.....	29
Prairie led by Manitoba.....	17

530 stations originated 5798; delivered 4334; relayed 11,609; total 21,741. (74.7% del.)



The Los Angeles section continues to set the pace and once again claims the Traffic Banner. This Banner goes each month to the section with the largest total of *real* messages. A traffic summary showing the standing of the various divisions for the past month is printed above. What place does yours take? What Section will carry the Banner next month and help its Division head the list?

DIVISIONAL REPORTS

ATLANTIC DIVISION

WESTERN NEW YORK — SCM, John R. Blum, W8CKC — W8BCZ leads the list this month. W8CUT has built several screen grid a.c. receivers that work very well. W8AFM reports the off-frequency situation much better on 14 mc. W8AAZ is having filter trouble. W8IH has a new 851 for his high powered phone transmitter. W8DSP has increased power to an 852. W8CKC is monkeying with 28 mc. W8BWB took exam for ensign in U. S. N. R. W8BDV is in Brooklyn for U. S. N. R. training. W8BFG is honeymooning. W8DME is busy with schedules. W8QL is working with twenty watts input. W8BCZ is working in a B.C.L. station with his new commercial license. W8QP is a new Official Observer. The Jamestown Amateur Radio Association is now affiliated with the A.R.R.L. W8AWM has a new license. QLC is a new Q signal up this way. W8BHK reports weather very poor for DX. W8CXH is trying out standard frequency work. W8CW is off the air until fall. W8DIL is having trouble with his receiver. W8CPC spends most of his time on 14 mc. Two new stations started up this month — W8CIL and W8AST. There are exactly 100 Official Relay stations in this section, 14 of which reported. Several fellows want Official Relay appointments, but the section is getting top-heavy. All Official Relay stations that do not report by September will have their certificates cancelled. Sorry, but you will do it yourself.

Traffic: W8BCZ 50, W8BYD 42, W8CPC 20, W8DSP 20, W8DME 12, W8QL 10, W8AAZ 8, W8DII 5, W8CSW 5, W8CKC 5, W8AST 2, W8CXH 2, W8BIF 2, W8CIL 2, W8H 2, W8BHK 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Forrest Calhoun, W3BBW — The summer slump has set in for sure as there was a large number of non-reporters. You know, fellows, you must report even if you don't have any traffic. Let's see if we can't get more reports next month. Maryland: W3AFF, our new ORS, says

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
K6EWB	223	55	758	1036
W9DZM	186	178	468	832
KA1HR	238	153	306	697
W6QP	97	72	468	637
W6BTZ	36	59	394	489
W1MK	49	67	310	426
W6BY	35	10	371	416
W8YA	83	65	256	404
W3BWT	95	105	188	388
W1PM	1	18	358	377
W2AU	138	181	6	328
W9COS	84	98	146	328
W3SM	43	56	223	322
K6UD	259	32	14	305
W6WA	82	211	7	300
K6HGX	95	8	188	291
W6IUT	144	34	104	282
W1CMZ	15	18	242	275
W6IDP	21	47	201	269
W6ALU	6	14	248	268
W6AOA	6	57	194	257
W6YCG	114	12	130	256
W6AWY	2	56	183	241
W1AMQ	79	29	125	233
W6ACV	195	2	12	212
W6EGH	71	128	—	199
W2QN	64	75	2	141
W9IDR	38	64	6	108
W9CFL	9	60	12	81

All these stations appearing in the Brass Pounders' League are noted for their consistent schedule-keeping and dependable message-handling work in amateur radio. Special credit should be given to the following stations in the order listed responsible for *over one hundred deliveries* in the message month: W6WA, W2AU, W9DZM, KA1HR, W6EGH, W3BWT.

Deliveries count! A total of 200 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 50 or more *deliveries* will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify you for B.P.L. membership also?

the QRN is bad during day and worse at nite. Hi. W3AIL, also complains of QRN and lack of traffic. W3BBW had a few but not so good as last year. W3ED says now that school is out he can report more often. W3IAW was QSO his home while he was in a plane over Detroit with only 3 watts input. F.B. W3DG says summer and yl-itis have him. Hi. W3NY was at the Radio Show in Atlantic City. Delaware: W3AIW will soon be an ORS. W3HC did his bit to help. W3ALQ doesn't get on much due to hot wx and bass fishing. District of Columbia: Our good traffic station W3BWT leads us all as usual. W3BF sent in his last report for our section and is now heard at W3GS in the E. Pa. section. Sure sorry to lose you, Jack. W3OZ finds traffic harder to get and skeds harder to keep. W3PM has a new AC receiver. W3AKH is going to put in an entire new station. I have been requested to ask all amateurs in Maryland and District of Columbia, who are interested in A.A. work to get in touch with me or the Chief Signal Officer, U. S. Army 3rd Corp Area., Baltimore, as they are organizing a chain and need your coöperation. Here is a chance to get traffic and skeds.

Traffic: W3BWT 388, W3BF 58, W3OZ 33, W3AIW 20, W3ZF 8, W3AFF 5, W3AIL 5, W3BBW 5, W3ED 4, W3PM 4, W3LA 3.

EASTERN PENNSYLVANIA — SCM, Don Lusk, W3ZF — Now that hot weather is here and DX or traffic work are not so good let's turn our efforts toward bettering our station for the coming radio season, by straightening out the bend or chirp in our note, calibrating our monitors and frequency meters and getting all set for good WX, so that you will be a credit to both the League and our section. We have a nice bunch of ORS in this section and there are several prospective ones in the making so we should have little or no trouble winning the traffic banner. The SCM is proud to welcome home the traffic hound, W3GS. W8CWO seems to be bothered with tennis, spring fever or what have you. Miss W3AKB has at last succeeded in getting a 14-megacycle Xmtr peaking and now she's after DX. W8EU

thinks that the great open spaces with YLs are heaps more appealing than these DELUXE warm evenings. WSDHT has a new antenna and an a.c. receiver perking FB. W3NF is moving for the summer. WSAWO isn't bothered with school now and promises better totals. W3MC reported by telephone when the time got late. W3UH is proving he is entitled to an ORS. W3UX is using the 7- and 14-megacycle bands for the summer. W3ZF is fooling around with 14 me.

Traffic: W3GS 140, W3ZF 123, W3NF 69, W8EU 47, WSDHT 31, WSCWO 24, W3AKB 8, W3UH 57, W3MC 55, W3UX 22, WSAWO 4.

SOUTHERN NEW JERSEY — SCM, Bayard Allen, W3ATJ — W3SM, our new Route Manager, makes the BPL with his first report of the year. He handled 322 with his 500 watt phone. FB! If you want skeds, drop him a line at 502 Oaklyn Ave., Oaklyn, N. J. W3ATJ has been very busy in the law office and only handled a few. W3KJ was off the air two weeks due to blowing his receiver tubes. W3BAN is still flirting with Old Man Hard Luck.

Traffic: W3SM 322, W3ATJ 10.

WESTERN PENNSYLVANIA — SCM, A. W. McAuly, W8CEO — This will be my last report as SCM for this section. As I turn over the work to my successor, Mr. Robert Lloyd, WSCFR, I wish to thank all of you for your co-operation and support and I sincerely hope that you will continue your good work under the supervision of Mr. Lloyd. I shall be glad to hear from any of you through the mail and station W8CEO will be kept on the air as heretofore. W8YA maintains the leadership but has dropped some schedules for the summer. W8DLG says the SG detector is FB. W8CNZ says there is plenty of traffic on 7000-ke. band. W8CMP had a narrow escape from serious injury when he got a shock from a condenser bank charged at 4000 volts. At last we have an ORS in Erie. W8GU is back at his old traffic game. W8CEO is building a 14,000-ke. transmitter to work in conjunction with the 3500-ke. set. W8AGO has his new crystal set going in fine shape. W8DUT reports a new station in New Kensington. W8CUG has been helping out with club work. W8CFR has returned from South America and reports a wonderful time visiting Brazilian amateurs. W8AVY is applying for an ORS and is going to get it. A fine letter from W8BTQ in North Braddock reports activity there. He is moving to Etna this month. W8CDH, W8DFA, and W8BTQ visited W8AEO and W8DCV of Altoona. W8ASE reports that his tube, reported as a 250 watt in this column last month is a "type 250" instead. Some difference. Wm. D. Craft, W8DNF, has been elected secretary of the A.T.A. Hunter Lohman, W8OC is now President. W8AJE is working on a transmitter for airplane use at Rodgers Field. W8BXG is Norman F. Pier's call at Union City. W8VF is active on phone and cw. W8BNU wants a schedule with South America. W8BVG says boat schedules for the summer are his dish. Any person or persons in the vicinity of Erie wishing to send in reports to the SCM can, if they care to, send them to the Erie Amateur Radio Club. They will then be forwarded in a bunch to the SCM.

Traffic: W8YA 404, W8DLG 48, W8CNZ 47, W8CMP 24, W8GU 20, W8CEO 17, W8AGO 6, W8DUT 6, W8AVY 14.

CENTRAL DIVISION

MICHIGAN — Acting SCM, K. F. Conroy, W8DYH — We regret that W8CEP is leaving us as SCM, but he claims he will be pounding brass more now, so all is not lost. FB work by W8AJC sure helped this month's total. W8AXM, W8CVU, W8CSG, W8BDI, W8AEM, W8BJT, W8CST, W8BPL and W8BTK are all new reporters. Welcome, OMs. W9AXE sez, "YLs". W8CKZ is keeping a few skeds. W8BRS claims 7 me. Radio Freqs are just that. (Freaks). W8BGY and W8AUB both want their ORS certificates shelved for a YL. W9DFS is pounding brass at sea by now. W8DDO is trying 14 me. W8TJ is just opposite to most of the gang — he reports tlc but says nothing. Some one raised Cain with W9EGF about something! Heh-heh. W8DSF will be on with new xmtr. and revr. and promises big things. W8BRO and W8CU say QRU. W8DED sez he's a RC now. W8DVQ likes AA work in a large way. W8AEQ says QRL but his total says different. W9CE will be on all bands soon. W8ACB claims he's a cold wx tlc-man! Miss W9GJX sez swimming is all wet,

but she likes it. Say, Gang, did you get any cigars from W8DRB? (9 1/4 lb.) YL. FB! W8DEN says if the off-freq. 3.5 me. phones would learn to talk with their hands, QRM would be more endurable. W8MV has a new 204a and only needs 6 or 8 more continents for a WAC. W8CWK is waiting for the gang to start something on 28 me. (How about organizing a 28 me. club? Write us). W8CAT is the new Route Mgr. for District 1. Who wants District 2 and 3 RM jobs? Lotta tlc will come from W8DAA this summer. W8DMS, W8JD, W8AJG, W8ALN and W8BAA will op. W8SH caught a lightning-bug and is teaching it the code. W8CEG and W8CST show the gang how to handle tlc with revr tube xmtrs, FB. Stations looking for tlc are W8AJC, W8CAT, W8JD, W8DDO, W8CEG, W8CST, W8AEQ, W9EGF, W8BRS and W8DYH — unload on them for efficient QSP. W8FX-City of Straits fame is alive again. W8BPL is at 1540 Cadillac, Detroit. W8DYH still sends code practise (5-12 WPM) 10 a.m. Sunday, 7 p.m. EST Tuesday and Thursday on 3600 kc. and has lotsa customers, including YLs! Mark THAT 16th of each month on your calendar now, and send in the reports. Let's knock 'em dead, Michigan.

Traffic: W8AJC 100, W8SH 1, W9GJX 13, W8ACB 10, W9CE 3, W8AEQ 57, W8DVQ 15, W8DDE 5, W8DDO 11, W9EGF 4, W8DFS 5, W8TJ 10, W8CVU 21, W8BTK 5, W9AXE 9, W8CKZ 5, W8BRS 16, W8CEP 9, W8CEG 17, W8DEN 11, W8MV 34, W8DYH 106, W8CWK 5, W8CAT 19, W8BDI 6, W8CSG 19, W8AEM 38, W8BJT 15, W8AXM 7.

ILLINOIS — SCM, F. J. Hinds, W9APY — W9DXZ and W9DOX are attending camp at Camp Grant (Rockford, Ill.) W9DXZ is rebuilding for fall traffic. W9AVE is a new man on 3.5 me. with a 210 at Yorkville. W9CYB blew out the old mercury arc. A buffer stage Xtal Control outfit is being installed at W9DAX to go with a Loftin White speech amplifier. W9DAX has logged 221 stations on the 1750-ke. band so far in 1930. W9EIR is home from school and pounding brass very hard now. W9FGW still has the fifty cent 210 he bought from W9BWK over a year ago and has worked 12 countries with it. Hi. W9ARY and W9FGW will hitch-hike to the Pacific Coast this summer. W9BDW is on again with a 203-A in HIC Hartley with 1500 V. for 7 and 3.5 me. W9DGK was logged in England on 28 me. FB, OT. W9ASY and W9APY both have new a.c. screen grid receivers. W9FUR just received a DeForest 503-A which will play on 14, 7 and 3.5 me. W9DZM stayed home all month and put his time to good advantage by hanging up a total of 832 messages. That is a nice mark for us all to shoot at. OM's. W9BYK was the host at a hamfest of the Peoria R.R.L. and nearby hams on May 31. W9KB has sold his high power outfit and is on 3.5 me. with low power. W9AFN is building a 210 outfit for 3500-ke. traffic work. The gang, including W9CYQ, W9RR, W9CFL, W9DTK, W9DOA, etc., gave W9CUH and the Waukegan gang a visit while they were at Great Lakes Naval Training Station. W9FPN worked XQO on 14 me. W9DJ complains of too much "Outboard Motor Boating." Hi. W9BNL is keeping his schedules very nicely with AA net. W9ERU is rebuilding to a Push-Pull TPTG. He took a message from WFAT. W9FCW lost his father this month. We are all very sorry. OM. Rectifier difficulties at W9BNR. W9FDY is receiving reports from Holland, England, Germany, etc. W9CCZ wants contributions of news from the gang for the CSRA news. W9AD has corn-field QRM. Hi. W9ANQ has now QSO'd 25 countries. W9AFF has left Thordarson Electric and Mfg. Company to go into business for himself. W9LL will be on a farm during July and August, where there is no electricity so he will only be able to receive. W9CKZ says two of his messages were from WFBT to Mobile Press, FB.

Traffic: W9DZM 832, W9CKZ 77, W9BIR 53, W9FDJ 40, W9AMO 37, W9BVP 28, W9ERU 18, W9AFN 11, W9BNI 10, W9KB 9, W9FCW 8, W9CUH 6, W9APY 5, W9DGK 5, W9DOX 4, W9GIV 4, W9ASY 3, W9DJ 3, W9FPN 3, W9GJX 3, W9BMQ 2, W9BZO 2, W9ACU 1, W9BDW 1, W9LL 10.

OHIO — SCM, H. C. Streck, W8BYN — I wish to say that I'm sorry so many of you report too late to have reports forwarded to me in Dayton, and therefore are not included. Last month several good ones lost out that way, and we need the totals too. Let's get up and 'em, gang.

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The Convention will be held here in Dayton the last few days of August, and already plans are under way. Better plans to come, because it's going to be good. Get further details from the Dayton gang via the air. W8LT, Ohio State University, leads the gang this month with 169. W9GZ comes next with 136. W8CNO has gone on a visit again this summer, and only had part of a month to work. W8BAC rolls up 70, which is not at all bad for hot weather. W8DDF is back with us until September, when he will go back to Purdue. W8NP, the faithful, turns in 51 without help of schedules. W8DU, another "9" to come to the "8th" is located in Columbus. W8BKM is still working fast and furious with AA and gets most of his traffic there. W8ADS has a complete new transmitter. W9DMX is out for traffic on 3.5 mc. W8CSS is taking a portable east with him July 14th to 28th. W8TK is leaving us for the summer. W8BGX and W8CX are keeping in touch with each other by radio while W9BGX is away for the summer. W8DVL reported by phone. W8BDU reports he and W8DMX took some messages, W8DMX calling the party on the phone, and enabling W9BXB to talk to his father. FB work, OMs. W8CX suggests that we run a "CQ Hound" column in *QST*. Hi. W8CFL is still plugging along. W8ARP leaves for Valparaiso, Ind., for the summer, but will be back in the fall. W8DDQ is going well, and the club is going to continue thru the summer for the first time in history. FB. W8DIH finds his time on the air very limited. W8DHK is off the air altogether on account of the YLs. W8BRR is still inactive, and darned if I blame him much. No "spanking" for you this time, W8APC. W8PL says air dead. W8RN is still on KFNA. The Warren Amateur Radio Club has been offering prizes to Warren amateurs for number of QSO's. W8DYC won first prize and W8BMF second. FB. Well, gang, this is a short report, but when so few report, there's not much I can write.

Traffic: W8LT 169, W8GZ 136, W8CNO 64, W8BAC 70, W8DDF 65, W8NP 51, W8DU 37, W8BKM 33, W8ADS 30, W8DMX 20, W8CSS 22, W8TK 17, W8BGX 10, W8DVL 3, W8BDU 3, W8CX 3, W8CFL 2, W8ARP 1.

KENTUCKY — SCM, J. B. Wathen III, W9BAZ — Heat Waves vs. Radio Waves! A knockout for the former. Get your old fashioned mint-juleps at W9AZY; he wins the Red Eye. W9DQC has a *speed-boat* for sale; a bargain at \$500. W9EYW says he was disappointed at the small bunch at the last meeting of the A.R.T.S. W9ACR is warming up and we hope he will be with us often from now on. W9AUH will celebrate the Fourth by opening up with Xtal. W9BWJ requests suspension from ORS duties for the time being. W9AIN had a nice trip and visited several of the Section hands. W9OX went fishing and got tanned. W9ARU with two ops and no traffic. How come? W9DDQ dropped to 14 kc. for the summer. W9FZV is pounding brass at Kyrock. W9FQN has an AC receiver going. W9BAZ has one humming. Hi. W9GAL expects to have xtal shortly. W9GBX will be going as soon as his two new masts are up. W9BAN changed to push-pull with gratifying results. To the ORS having the largest total of traffic from June 15th to Sept. 15th, the SCM will donate an ORS A.R.R.L. pin. There are many active stations in this Section who never report. Give us a little dope once in awhile, OMs. Glad to see any of the gang if they get to Louisville. Just gone Belmont 2145. YL's acceptable, and how!

Traffic: W9AZY 104, W9OX 56, W9BAZ 15, W9AIN 11, W9BAN 7, W9FQN 7, W9AUH 6, W9EYW 3, W9FZV 3, W9DDQ 2.

INDIANA — SCM, D. J. Angus, W9CYQ — W9CUD has just completed and delivered the crystal temperature control and the power supply for WLAP at Louisville. W9ENX is at the Valparaiso Radio School. W9EGE, W9RS and W9DZX and W9FBH are back from school and operating the home stations. W9DDB is now on with W8DDF at Cincinnati. W9BHE and W9DXM are new stations at Elkhart. W9CIC has been appointed chief radio officer of unit one, section three, U.S.N.R. W9FCX has moved to South Bend. W9FHB is a new ham at South Bend. W9GGJ had three more tubes go west. W9YV is the new call of the Training School at Valpo. W9RW is now the portable call for the school. W9ASX is in the land of the "spiks" doing commercial operating. W9EPH reports for the Richmond gang. W9CMQ says the Richmond Police Dept. received

their O.K. from the F.R.C. and as soon as appropriations are completed work will begin on a 50-W. Xtal control transmitter. W9BZZ is on the sick list. W9FXM is back on 7000 kc. after a trip to the hospital. W9FXO works 14 mc. every p.m. W9FKE is remodeling his home to fit his transmitting equipment. Hi. W9CWS handles some traffic.

Traffic: W9GJS 9, W9AKJ 29, W9GGJ 11, W9DDB 23, W9AIP 26, W9CYQ 13, W9RS 2, W9EPH 10, W9CWS 14.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9GFL is doing good work at Green Bay and has been appointed an Official Broadcast Station, operating mostly on 3750 kc. W9OT is still on the job and took a 136 word msg from WFBT without a break. W9CER is a new station at Jefferson. W9VD is working mostly on 7150 kc. and occasionally on 14240 for the summer months.

Traffic: W9GFL 38, W9OT 4, W9CER 2, W9VD 4.

DAKOTA DIVISION

SOUTHERN MINNESOTA — SCM, J. C. Pehoushek, W9EFK — W9COS is off daily schedules for the first time since October. Leach of W9BN has the 7000-kc. set getting out nicely. W9DRG lost his antenna in the Southern Minnesota cyclone. W9BZE will be on 24 hours a day with five operators after the first of July and is open for schedules. QRA is W9BXE, Corp. Marion Alewine, H. Q. Co. 3rd Inf. Fort Snelling, Minn. W9EFJ is on spasmatically. W9AKN — W9CTT worked WFAT. He also was host to CE1AX. W9GHO has been busy with orchestra and fishing. W9DGE is trying for the Minneapolis Police Short Wave Station. W9DMA is QRL. W9EYL is building a new a.c. receiver. W9BNF is on only Sunday evenings. W9FLE, a new ORS, will be active on 3500 kc. Sunday mornings. W9BQF says business is good, no time for radio. W9DSH is haunting Lake Minnetonka. W9EOH is busy at KSTP. W9ELA is at new QRA about six blocks from the SCM. W9FIK is a new man in South Minneapolis with a beautiful 210 transmitter and a screen grid receiver. W9BLG has gone back to Winnipeg. W9YC will be closed down for the summer. W9AIR is going on his vacation. Radloff attended a hamfest which Goblish, W9FLE, sponsored. They got acquainted with the Western Minnesota hams, W9EJE, W9EZJ, W9BGG, W9BBN and W9DRK. All these except W9BBN operate on 1750-kc. fone. W9BBN has a 7-mc. xtal. W9DRK of Madison works on 14 mc. W9EJR has the memps. W9BNN is planning an elaborate outfit for next fall. W9FMB is assigned to a shut-in at Morristown. He will be on 3.5 mc. and wants tests.

Traffic: W9COS 328, W9DRG 108, W9BN 144, W9BZE 10, W9EFK 8, W9? 3, W9GHO 3, W9DGE 1.

NORTHERN MINNESOTA — SCM, C. L. Jabs, W9BVH — W9AV leads the Section in traffic and sends in a lot of news. His sister, W9EXU, is still getting cards, letters and fotos by the bushel. W9BCT had his transmitter at the Northwest Aircraft Show in St. Paul. W9ADS is still on with his Hartley but has his CC job coming along fine. W9EHO is too busy with farm work to pound brass. W9C1Y has business QRM. W7BVH is installing a transformer to increase the plate voltage on the frequency doublers and it is hoped the output will go up. Few reports were received and there will be some cancellations of ORS in the near future. Read the rules, fellows.

Traffic: W9AV 20, W9BCT 6, W9ADS 2, W9BVA 2.

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — The Jamestown Gang had a visit from W9IK. W9IK is hitting the fone strong and reports that four of the gang are going on N. R. cruises this summer. W8DM is also down in Jamestown teaching summer school and running W9BVF once in a while. W9DGS is busy with summer work. W9BVF visited W9DHQ in Wishek and found that we may have a new ORS amongst us.

Traffic: W9BVF 17, W9DGS 3.

SOUTH DAKOTA — SCM, D. M. Pasek, W9DGR — W9DB is on 3.5 mc. with a xtal and is trying to get a fone going on 14 mc. W9CIR went to the convention at Ames and while there passed the exam for Broadcast operator's license. W9CKT, Madison, got daily news direct from the National Guard Camp at Rapid City. W9DGR went to Duluth and took a broadcast operator's exam. A ripping good time was had with the operators of WRL of Duluth and KSTP of St. Paul. This is my last report, gang. I want

to thank those of you who reported regularly. Howard Cashman, W9DNS, Sioux Falls, is our new SCM. Give him lots of support and help him put the South Dakota Section on the map.

DELTA DIVISION

ARKANSAS — SCM, Henry E. Velte, W5ABI — With the arrival of the hot season it seems that most of the hams in this state have deserted their radio shacks for outdoor sports, which reminds us that W5IQ has seriously taken up miniature golf, while W5ABI is getting in as much fishing as possible. W5AGB and W5ADB are two new stations in Little Rock. Welcome, Oms. W5AY is the proud father of a new baby boy. Congratulations! W5BLG has been rebuilding. W5BMI has a new generator and has increased power. W5ABI is getting out well with a DC note. W5LV, our Route Manager, is rebuilding to a xtal controlled rig. W5BKT is on the 7-mc. band and looking for traffic. W5ACM is the proud owner of a new second class ticket and is operator at KFPW at Siloam Springs, Ark.

Traffic: W5ABI 27.

TENNESSEE — SCM, James B. Witt, W4SP — Here with traffic report for the month of June. W4KH handled traffic from OMITB and VK. W4VK has installed xtal. W4HK is moving his rig to roof of ten-story building and should have a good starting point for that WAC. W4DG is collecting parts for MOPA. W4FX is watching W4DG to see how it's done. Knoxville will graduate three new hams this month. Come on, fellows, let's keep the amps flowing this summer on 14 and 28 mc. and let the SCM know what you are doing. W4SP is on a two weeks' auto trip through Canada and the East. W4AGW is a new station.

Traffic: W4KH 17, W4VK 10, W4CW 6, W4FX 26, W4AGW 36, W4AFS 19, W4RO 6, W4CW 6.

LOUISIANA — SCM, F. M. Watts, Jr., W5WF — Summer is here and with it comes reports of less traffic and dx. W5BJA leads in traffic this month. W5ANA is installing a xtal control outfit. W5YW reports that most of the ops have gone home for the summer. W5AKW is home from L. S. U. now. W5RR (the old man) is on 7 mc. and is getting out fb with his 50 watter. Hi. W5BHH will be at W5YW for the summer. W5BKL is pounding out on 7 mc. continuously. W5BHV is now in the Army-Amateur net. W5WF will be back on in few days from a new location. W5EB worked Canadian General Manager Reid, VE2BE, for the first contact on the Directors net for his station. The Shreveport gang is going to throw a big hamfest the latter part of the summer. All A.R.R.L. members in Louisiana, East Texas, Southern Arkansas and Western Mississippi are cordially invited to attend. Also, any others who desire to come please write. More particulars later.

Traffic: W5BJA 47, W5ANA 27, W5WF 17, W5YW 8, W5BKL 6, W5EB 20.

HUDSON DIVISION

EASTERN NEW YORK — SCM, H. Rosenthal, W2QU — With the coming of summer, the reports have fallen off and those reporting show a marked decrease in the amount of traffic handled. ORS are expected to report each month, even if no traffic is handled, so if you are away on vacation when the 15th rolls around send in a picture post card instead of the regular one. W2QN makes the BPL with all foreign messages. W2LU is practising on the new Vibroplex presented to him by the local power company in appreciation of the help he gave them during the December ice storm. W2BKN says every time he hooks a foreign station, it turns out to be one of the U. S. Marines on foreign duty. W2BAI is downhearted. He heard AC5SL CQing and missed him. W2AYK spent his time on active duty with the Naval Reserve copying the Graf Zeppelin. W2ACB isn't sure whether it's good or bad luck to send in a report with thirteen messages for the total. W2ACY reports copying the Graf every night on its trip to Lakehurst. W2ANZ reports exams interfered with traffic this month. W2BJA reports the air dead during daylight hours since spring started. W2QU handled traffic for the Yancey plane on its South American good will flight.

Traffic: W2QU 328, W2QN 141, W2LU 95, W2BAI 17,

W2ACB 13, W2BKN 3, W2AYK 3, W2ANZ 3, W2ACY 2, W2BJA 1.

NEW YORK CITY AND LONG ISLAND — Acting SCM, V. T. Kenney, W2BGO — Manhattan: W2AFO leads his boro with a total of 21. W2BDJ, a new 00, tells us there are still plenty of off-frequency stations. W2BNL can also be recognized as Portable W2ZZH, which will be operated along the Atlantic Coast. Bronx: After getting lots of traffic from RXIAA, W2AII had to quit the sked on account of QRN. Plenty of skeds gave W2BPQ a good total. W2AET tells us of W8BDV stopping at his shack and seeing the sights in N. Y. C. W2AQG complains of other activities keeping him away from the set. W2VG QSOd XWIM and received a report from a New Zealander. W2APV still skeds NJ2PA and HH7C. Brooklyn: Now that exams are over W2BIV promises better traffic totals. W2ATZ is working lots of VK and K6 stations. W2ARQ is keeping 6 skeds a week. W2PF is off the air for a month while he attends Ft. Monmouth military training. W2APK has a third op pinching-hitting for him while he is on a vacation. W2REV has forsaken 3.5 mc. until the QRN lets up. W2RO is closed down for the summer. Long Island: As usual W2AVP, RM for L. I., leads that part of our section and nominates W2AST for the office of ORS. W2AST is a new station in Long Beach. W2BFC tells that his 2nd op is having trouble getting his set working. W2AYM, the Boy Scout station, is to change QRA. W2AIQ-W2AFP, our latest addition to the 00 list, is checking 'em on both 7 and 3.5 mc. W2BNX tells us that his portable outfit, W2AFU, will be at the Mineola State Fair for about a week starting Sept. 17th; several reliable skeds are wanted with New England, Phila., Chicago, etc., for U. S. traffic. W2AIQ is checking as a new 00.

Traffic: Manhattan — W2AFO 21, W2BDJ 13, W2RNL 4, Bronx — W2AII 73, W2BPQ 63, W2BGO 24, W2AET 9, W2AQG 7, Brooklyn — W2BIV 85, W2ATZ 70, W2ARQ 47, W2PF 37, W2APK 16, W2BEV 5, Long Island — W2AVP 18, W2AST 14, W2BFC 2.

NORTHERN NEW JERSEY — SCM, A. G. Wester, W2WR — It is necessary to remind traffic reporters that reports are due here on the 17th on each month as some still are under the impression that the traffic month ends on the 25th. Please mail reports early. W2JF has been selected as Route Manager and your SCM is sure that he can arrange skeds for any of the gang. Please give him your fullest cooperation. W2AOS has enlisted in the U.S.N.R. W2APU reports. W2CWK reports that the Raritan Valley Radio Club had a very successful banquet on June 14. W2JC has a new rectifying system under way using 866's. W2AGX is playing with 3500 kc. W2BPY won prizes at both the Hudson Division and the Raritan Valley banquets. W2BDF is still busy with BC station duties. W2CJX only operates on week ends. W2BY took a 10-day trip to Canada with another YL. Following are notes on the activities of the Bloomfield Radio Club. The following members are all on the air and with xtal control: W2BCC, W2FL, W2AFB, W2VQ, W2BVB, W2BA, W2MB, W2FP, W2GG and W2JC. W2RUH steps out with W8AOI at his home at Seet Run, Pa. Ten members attended the Raritan Valley banquet. Colonial Airways at Newark Airport has the following amateurs on the pay roll under the supervision of F. W. Webster, RE., W2CO, W2VQ, and W2GG, who all are operators on the tri-motored Fords using calls W10XN and W10XAD. W2ZZA worked all continents except Asia last month on 14 mc. W2CFQ sends in his first report. W2BJZ is another first reporter. W2AFJ using 210s in push-pull is stepping to all points of the globe.

Traffic: W2JF 66, W2AOS 14, W2CWK 11, W2JC 1, W2AGX 3, W2BPY 11, W2BDF 6, W2CJX 10, W2ZZA 7, W2CFQ 12.

MIDWEST DIVISION

NEBRASKA — SCM, C. B. Diehl, W9BYG — W9ANZ is again laid up in the hospital. W9DFR had to take down antenna on account of roof repairs. W9EEW is very busy at this time. W9EBF is rebuilding KMMJ. W9FAM is still rebuilding with heavy fall and winter tlc in mind. W9EHW is experimenting with antennas. W9BHN is on vacation. W9DI built a new receiver. W9BOQ is very busy with farm work. W9BLW is on 7000 kc. again. W9CPJ sends first report as ORS and works mostly on 1850

kes. right now. W9BEX sends first report and it is a "peach," too. W7CGW has sked with W7HX.

Traffic: W9DTH 1, W9DFR 6, W9EHW 1, W9BHN 4, W9BLW 3, W9CPJ 4, W9BEX 12, W9CGE 3.

IOWA — SCM, H. W. Kerr, W9DZW — W9CKQ keeps sked with VK5HG and has 393 QSOs to date; by special permission of the Radio Inspector in VK they are handling traffic between the Dept. of Research in Terrestrial Magnetism, Washington, D. C., and the Magnetic Observatory, Watheroo, West Australia. W9WJ is out for an ORS. W9FFD reports qso with WFBT. W9EQJ finds carpenter work fb. W9FUD is with us in spite of qrn. W9FZO got his qsl from a K6 and plans to rebuild. W9ACL adds his bit to Davenport's reputation. W9GKL finished hi-school, visited the Iowa City gang and got a bit of tfe on 3500 kc. W9DPL sea since getting the 8 mfd condensers at the Ames convention he gets PDC reports. W9CKD is schooling at Valparaiso for a com'l ticket. The Tri-State Club have a "treasure hunt" the 22nd, prizes given for locating W9TA, the club's portable. The Co. Bluffs gang are interested in the "Radio Guild" a new club of Bluffs and Omaha hams and service men. W9GDG is appointed OBS. W9DDX is on the air with a 201p and 150 v B batts.

Traffic: W9CKQ 43, W9WJ 40, W9DZW 37, W9FFD 23, W9EQJ 22, W9FUD 18, W9FZO 13, W9ACL 8, W9GKL 3, W9DPL 2.

MISSOURI — SCM, L. B. Laizure, W9RR — W9DZN is still operating for the Miss.-Warrior Service, QRA 88 Wynoka, home port Dubuque, Ia. W9PW led in traffic this time from St. Louis. W9FTA followed close with a majority of delivered messages. The balance of the activity came from W9HG, W9AMR and W9DYJ. W9AMR reported twice to make sure of getting in, as did W9GAR. Kansas City: W9RR, W9CFL and Ensign Lowe, chief at WDAD, were on a cruise at Great Lakes with the U.S.N.R. and report a very pleasant trip. W9DQN lost his second op, as W9EC's went to Dodge City for the W. U. W9DQN handles a good many messages from Ft. Leavenworth to P. I. addresses. W9AKZ had to move but kept one sked going. W9DPA is on 14 mc. W9CFL is kept busy working U.S.N.R. skeds. W9DHN took a night off and went back to 3.5 mc. looking for old friends. W9GAR is still pounding brass through QRN. W9BIA says there is still some traffic moving. W9EYG sold his one to W9FVM and is now using 3.5 mc. CW again. W9EPX just got back on the air. W9BGN reported QRX for filter to arrive. W9EMM is planning active organization of a U.S.N.R. unit in St. Joseph. W9DNO was too busy to operate much but still has hopes. The following will cruise with the U.S.N.R. on the Great Lakes or have already done so: W9CFL, W9RR, W9AJW, L. G. Riddle.

Traffic: W9DYJ 5, W9FTA 29, W9PW 33, W9GHG 6, W9AMR 4, W9DNO 2, W9BJA 33, W9GAR 9, W9DQN 25, W9AKZ 20, W9CFL 81.

KANSAS — SCM, J. H. Amis, W9CET — W9CET leads the section in traffic and has been on for the 28,000-kc. tests. Any one going on the fourth U.S.N.R. cruise please get in touch with W9BWV. W9BTG has left for the Gulf Radio school. A 3000-volt MG is the plan of W9DFY for fall. The YL, W9CGM, says she is ready for big business now. W9GHI has gone to the harvest fields. W9DEB has his transmitter at the U.S.N.R. Armory as a temporary unit station. W9FLG is working long hours so doesn't get to be on much. W9HL is forced to resign his ORS and we sure hate to lose him. W9EUX is out of town most of the time so is on little. W9BHR is working on a new idea in frequency meters. The KVRC report that plans for the Division Convention in Sept. at Topeka are progressing nicely.

Traffic: W9CET 43, W9BWV 28, W9BTG 6, W9FDY 3.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Fred A. Ells, Jr., W1CTI — W1AMQ makes the BPL with a rush. W1MK sends in their usual high total and continues to occupy space in the BPL. W1AFB has a daily schedule with VOQH and is experimenting on 28 mc. W1RP is taking a portable on a trip to Cleveland with W1AZP. W1HQ was visited by W9BYE. W1TD wants to know where the gang is on CTNITE. (So does the SCM.) W1AMG is active in the T.C.R.C. W1ADW has been playing with 28 mc. but doesn't hear anyone. He will use same call with his portable this

summer. W1BHM won the Third International Contest certificate for Conn. F.B. and congrats. W1UE is inactive but busy at Headquarters. W1AZG is having good luck with his low power set and will increase power soon. W1BBU sends in his first report and applies for ORS. W1BVW reported in person. W1CTI and W1VB attended a meeting of the T.C.R.C. at New Haven. W9KL and W1UE were on hand from Headquarters. The T.C.R.C. is to be complimented on their fine new clubhouse. They will have a station in operation with a lot of ops in the very near future. W1AJB asks to be placed on the inactive list for two months. He reports, W1AUT, a new station in Middletown. W1AGZ, 00 for this section, reports several off-frequency stations. Only twelve stations moving traffic this month. Let's see if we can do better than that and give Eastern Mass. a little competition!

Traffic: W1AMQ 233, W1MK 426, W1AFB 39, W1RP 10, W1HQ 12, W1TD 12, W1AMG 6, W1AZG 2, W1BBU 7, W1CTI 9, W1BVW 6, W1AJB 8.

EASTERN MASSACHUSETTS — SCM, Miles W. Weeks, W1WV — A number of the ORS forgot to report this month so our total has suffered in consequence. W1CMZ shows his usual consistency and is the only one to make the BPL this month. Most of the gang are either vacationing or rebuilding during this period of poor radio weather. W1ACH has been on 15 days' duty with the U.S.N.R. and reports visiting Portland hams during one of his cruises. W1LM is playing with 14,000 kc. but says spark plug QRM is bothersome. W1ASI is keeping several skeds on 3500 kc. A "B" eliminator is doing duty on W1ACA's receiver with good results. W1BOB reports by radio from Europe, where he is signing NAMS on 7000 kc. W1WU has built a new receiver. A newcomer is W1ABG who has been working some good DX besides a little traffic work on 3500 kc. W1ADK also submits his initial report. W1WV has acquired a fine cabinet in which to house one of his Xmters and has rebuilt accordingly. The new Norwood hams, W1CCP and W1CQN, are still experimenting with their transmitters but find time for some traffic. W1QZ has resigned his ORS due to what he calls an "incompatibility complex." W1KH reports being QSO with HAF3C. Due to a change of QRA for the summer he will not be on the air much until fall. W1LQ is active again on 3500 kc. Now is the time, gang, to be making your arrangements for good skeds, better traffic routes, and a good time to get the bugs out of your equipment.

Traffic: W1CMZ 275, W1ACH 116, W1ASI 79, W1BXB 74, W1WV 53, W1KH 42, W1ACA 30, W1LM 28, W1LQ 23, W1ABG 16, W1ADK 5, W1CQN 4, W1CCP 3, W1WU 1.

MAINE — SCM, G. C. Brown, W1AQL — Word has just been received, from Chairman W. Haskell, of the Committee on Arrangements, that the Maine Convention has been approved by Headquarters and Director Fred Best. A fine list of speakers has been lined up and there will be a real "bang up" time for everybody August 22nd and 23rd. Make plans now to attend and help the Forest City gang put it over. W1BIG and his gang of hit-and-run ball players recently enjoyed a fine week-end at the Naval Station at Cape Elizabeth. The boys had a chance to inspect the station and visit one of the Eagle boats, which was in the harbor. The Queen City gang have organized a ball team and expect to take on the Augusta boys for a hot game sometime during the latter part of July. W1FQ recently enjoyed a two weeks' training trip at Fort Monmouth, N. J. W1CDX is on a two weeks' cruise at Cape Elizabeth. W1AHY is moving his station to Peaks Island, Portland, for the summer. W1KQ will be working for the W.U. in Northeast Harbor for the summer months. W1BEZ is getting out FB with his 'phone. W1GQ was a recent visitor to the Queen City. W1OG, formerly W1AIT, is on the air with a crystal now and has a fine signal. The many friends of Phil Gould, of W1ALZ, are very pleased that he is improving after an illness of several months. The station of the SCM is undergoing a rigid reconditioning prior to the fall rush of traffic. W1BFZ is high man this month. FB, Mel. W1QH comes in second and reports conditions still very poor. W1ARA, of Lynn, Mass., has been assigned the position of operator at station WAB1, Bangor. Welcome, OM.

Traffic: W1BFZ 41, W1QH 9, W1AQL 2.

VERMONT — SCM, Clayton Paulette, W1IT — A

wonderful time was enjoyed by W1BD, W1CGX, W1BCK, W1BDX, W1TJ and W1IT at our annual hamfest held at W1IT's camp on Lake Memphremagog. I am going to extend the invitation to all Vermont hams who wish to come next year. Only one station this month, W1BD of Barre, turns in a report. He is joining the Army net, and also says he will have a low power outfit in Burlington this summer. W1FN in White River Jct. is now on 3500 and wishes to QSO any of the Vermont gang as soon as possible. We have a new amateur on the air in Hinesburg, Vt., now. Please extend a helping hand to him. His call is WIATF.

Traffic: W1BD 20.

WESTERN MASSACHUSETTS — SCM, Dr. J. A. Tessmer, WIUM — W1BVR blew his fifty and is now back using his 3-yr.-old Meuller 30 watt. W1ADO is still building his long-awaited for xtal fone. W1BEG is having a hard time trying to make his filament transformer keep cool on his 211 tube. W1BZJ reports that he will spend his vacation in Washington, D. C. WIUM finally put his 50-watt xtal outfit on the air and is getting out fine. Rumor has it that W1AM has a 250-watt xtal fone under construction and will soon join the ranks of the "Fone Boys" on 3500 kcs. W1ABY in Leominster is heard regularly on 3500-kcs. fone. Smitty, W1BMM is still upholding the Heart of the Commonwealth on 3500 fone and is experimenting with C.W. on 3900 kcs. W1CRX has come home from the Briny Deep and is now operating at WORC. W1BKF passed his Commercial and is shipping out as soon as his ship comes in. Worcester has two new hams, W1BDP and W1BAU. Both are pounding out fine on 3700 kcs. W1ASU is busy with Naval Reserve work. Any amateurs interested in either the Reserve or the Navy net are invited to communicate with him. W1AMZ is back from college and will be on during the summer. W1ZB has a brand new jr. opr. Here is W1N's uncensored report, "Dear SCM: Nothing much here this month, since I wrecked my car on Memorial Day and, same as ever, it was a YL driving that car, so it's no surprise, hi." W1ASY has a keen crystal outfit on 3700 kc. The Worcester Radio Association had their seasonal wind-up June 19th enjoying seven reels of movies with eats at their headquarters, no. 274 Main St. There will be no regular Thursday meeting until the first Thursday in September. With this report WIUM is signing off as SCM and thanks the gang for their co-operation. Leo Peloquin W1JV-24 Arthur St., has been unanimously elected SCM to serve for the next term. Congratulations, OM, and best wishes.

Traffic: W1NS 94, W1ZB 4, W1BVR 40, W1BEG 10, W1BZJ 10, W1ASU 2, W1ZA 19, W1BEA 10, W1BSJ 10, W1ASY 6.

NEW HAMPSHIRE — SCM, V. Hodge, W1ATJ — As I was reelected SCM, I wish to thank you for your support and ask for your co-operation in making this section one of the best during the coming two years. Congratulations are in order for W1APK who says he is engaged to a YL he met via radio. W1AUY manages to keep a couple of skeds during the hot Wx. W1IP says ND there as the Wx is too nice to stay indoors. Hi. W1BAC is reaching out with his 201-a on 3500 kc. W1BIS is DXing on 14 mc.

Traffic: W1APK 6, W1IP 4, W1BAC 4.

RHODE ISLAND — SCM, C. N. Kraus, W1BCR — W1MO built the push-pull job in June *QST* and has it going on 14 mc. W1BML is building the same set. W1CBS has a sked with WSBUI. W1AVH is building a new sky hook. W1BCR is on 14 mc. with an 852. Members of the Radio Club of R. I. are designing a new crystal control 500 watt CW and fone set which should be ready in the late summer or early fall. It is also planned to have television modulation on this transmitter. Hollis S. Baird, Chief Engineer of the Short Wave and Television Labs. of Boston, W1XAV-W1WX, addressed the club at an open meeting held at Brown University. Mr. Baird described his system of horizontal beam transmission using a steel tape held in a drum replacing the conventional scanning disc. He received pictures on one of his receivers from W1XAV and W3XK. W1CHP is back from Andover and expects to be active this summer. W1AWE is taking some of the Naval Reserve summer cruises and is having a fine time.

Traffic: W1MO 18.

NORTHWESTERN DIVISION

MONTANA — SCM, O. W. Viers, W7AAT — W7DD has new receiver and transmitter and reports good results. W7FL is back at his old location in Butte. W7AAW turns in a nice total despite "spring has come!" W7AKO of Billings reports changing location to Butte soon. What has become of W7MI and his 50? W7JC will be in Billings for the summer. W7AEM has gone with the National Guard to the camp at Helena. W7AFY formerly of Bozeman is now in Billings. New hams will soon be on in Billings, Fromberg and Red Lodge. W7AAT will soon be on with a new 500 watt transmitter.

Traffic: W7AAT 125, W7AAW 69, W7DD 24, W7FL 4.

WASHINGTON — SCM, Eugene A. Piety, W7ACS — The plans for the convention seem to be keeping the Spokane gang off of the air. Let's see you all there this year. W7QF, the vice-president of the Spokane Club, is using a bandbox super and it works fine. W7TK is installing a ham xmt at the Boy Scout camp for a few weeks. W7AFD can't see his xmt on account of a new Chev. six. W7AG is using fone set now. Alaskan skeds keep W7TX supplied with traffic. W7RT had the pleasure of visiting a Swedish op whom he had worked on the short waves. W7BB is back on the air again after touring around as radio op on a ship. W7AJB merely reports. W7VC reports for the first time. W7NR is too busy to be on the air much. W7AIT takes high place this month. W7ACS has been busy with school exams. The call of the sea has reached another: W7ACE shipped out for the Orient. W7KT uses 300 volts on batts. on a fifty watt and gets 65 fm K6. The Yakima gang have persuaded the Chamber of Commerce to furnish all their QSL cards. W7AAE divides his time between selling bonds and pounding brass. Don't forget the convention, fellows.

Traffic: W7AIT 51, W7TX 39, W7AAE 29, W7RT 24, W7AG 8, W7AJB 5, W7QF 5, W7NR 4, W7KT 4, W7TK 4, W7ACS 2, W7VC 18, W7BB 8.

OREGON — SCM, W. S. Claypool, W7UN — Cancellations are in order for all non-reporting ORS if their indifference continues. W7ALM handles a lot of worth while traffic with K7 stations. W7AHJ reports a nice total. W7AJX reports tfe. W7AMF is hopeful for better conditions soon. W7WL is handling a lot of DX traffic and getting in some fishing too. W7ABH shipped out on the S. S. *San Gabriel* and doesn't think that he will be on the air for several years. W7QY reports keeping regular sked with SFEN, the S. S. *Indian*, bound Brisbane. W7QY is a new ORS. W7AMQ changes his outfit so often he finds little time to operate. Ten members of the R.C.A.R.C. went on a week-end trip to a nearby lake and took along a complete transmitter but W7OM, the culprit, forgot to come and bring the receiver. Hi. W7UN just returned from a week-end cruise to Astoria with the U.S.N.R. W7WP is back in town after going to school, where he learned the crystal grinding trade. W7WV is struggling to get on the air with a real outfit. W7AP is on the air whenever QRN is not bad. W7AEU is planning to put an 851 stage on his 3.5 mc. fone. Hi. Let's hear from all the ORS next month!

Traffic: W7ALM 62, W7AHJ 32, W7AMF 27, W7WL 21, W7AMQ 10, W7AJX 10, W7QY 5, W7ABH 8, W7UN 23.

IDAHO — SCM, James L. Young, W7ACN — (Reported by Oscar E. Johnson, W7AKZ) W7ALW is busy on 7 mc. with an 852. W7AJQ finds some traffic on 14 mc. W7AHG is on now and then with a 210. W7AFN and W7AR are busy with "talkies." Work with power lines keeps W7QC off also. W7AKZ is trying to get on 28 mc. W7UM is moving to Kent, Wash. W7QB has sailed for Alaska as a commercial op. W7AF is on 7 mc. W7BV is too busy to be on. W7CG reports qrn but finds 14 mc. good. W7ACP, W7ALY, W7ALH and W7ANA, all of Parma, are all on and making lots of QSOs. W7AFE has quit ham radio. W7ACP has trouble keeping one of his transmitters oscillating. W7AFT reports QRN trouble, but manages to keep one sked twice a week. W7ZZF, portable call of W7ALC, is touring the U. S. A.

Traffic: W7ALW 20, W7AFT 11, W7AKZ 2, W7AJQ 6.

PACIFIC DIVISION

SANTA CLARA VALLEY — SCM, F. J. Quement, W6NX — Congratulations are in order this month for W6BAX who ran up the highest score in the International Tests. The SCM is mighty proud of this achievement, bringing as it does such favorable publicity to the Pacific Division. W6YG closed up for the summer on June 15th with a nice traffic total putting them in the BPL. W6DQH, the RM, is working with Army net and Boy Scout work — FB. W6ALW will have xtal 203A soon. W6BMW is still busy developing phone sets for Stage Fire Warden. W6EEC, a new arrival in this section, is working on 14,000 ke. W6AME moved again and between that and answering the lure of the trout streams, radio will be ND for the summer. W6QA is now on with a new CC job. W6NX's xtal set will soon be completed. W6HM is vacationing in British Columbia for the summer.

Traffic: W6YG 256, W6DQH 57, W6ALW 48, W6BMW 18, W6EEC 8, W6NX 6.

EAST BAY — SCM, J. Walter Frates, W6CZR — Conditions in traffic handling this month point to the fact that the entire section has moved to the country for the summer or that it is so concerned with present economic conditions that there is no time or thought for ham radio. W6BTZ was high man for the section during the past month, handing in a particularly high total before departing for Seattle to join the U. S. Geodetic Survey boat *Guide*. W6ALX, the next high man, has been holding an interesting schedule on 7 me. with a party of East Bay Section Boy Scouts who are touring the National Parks of the West under the guidance of Ansel Hall of Berkeley. The Scouts have a Heintz and Kaufman portable transmitter which is putting a strong signal into the section. Their day by day story of the tour is being published by a San Francisco newspaper. W6AOY is a new candidate for an ORS. W6RJ has been working a great deal on the plans for the "hidden transmitter" stunt of the Oakland Radio Club for the Fourth of July. W6BI of Berkeley sends in only one cryptic word to explain his low totals — "Vacation." W6BZU at Concord reports that the weather is too hot in his secluded valley for consistent traffic work. W6BIW is planning on building a sailboat for Lake Merritt and as soon as it is finished he will install a transmitter and receiver on it — if the boat doesn't sink. W6BMS says that his canoe is almost finished, and he may be back on the air soon if he is not too busy using it. W6ASJ has been doing his usual amount of work as an Official Observer, but reports the traffic as nil. W6CGM reports that he and W6DWI have been trying to get some DX with a fish line and sinker near Rodeo. W6BSB reports from New York that the Roumanian Arctic Expedition has been cancelled but that he is staying on in the east for a while. W6CZR and W6ARU have been too busy with the arrival of a new junior op — a YL this time — to think about putting the old coffee percolators back on the air. W6ARU plans to send out a QST of thanks soon for the flowers sent her in the hospital by the section members. W6AN has his transmitter on the air and plans to open his first schedule soon on 3500 ke. W6GQ has been keeping a shed with his son, W6CFD, who is on a camping trip with a party of Scouts in the mountains. W6AQ is working hard on plans for installing a traffic station at the Pacific Aeronautical Exposition at the Oakland Airport. The Northern California Pre-Convention Round Up and Hamfest was held by the section at KTAB and was a huge success. San Francisco, Modesto, San Jose, and Sacramento sent delegations. W6RJ acted as master of ceremonies and James Warner of KTAB fame was one of the principal speakers. W6ZD, Pacific Division Director, read the report of the decisions of the Board of Directors, and there was much entertainment by professional and ham talent. W6BA officiated as usual with Oscar, the dummy.

Traffic: W6BTZ 489, W6ALX 169, W6AOY 25, W6RJ 21, W6BI 5, W6BZU 5.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6ANV leads this month and makes the BPL. FB, OM. W6EOP is very QRL with fone. The SCM visited W6FP in Oceanside and W6BGL in Escondido and had an FB time. W6CTP graduated from the Fullerton J. C. and says he will now have more time for tfe. W6AEP was also visited by the SCM. W6BGL is now on fone. W6EPF is troubled with

pwr leaks. W6EPZ says no more time for tfe and requests cancellation of his ORS. W6CTR is heard on fone now. W6BAM built the new a.c. receiver and says fb. W6BAS says to bring on those frequency meters and he will calibrate them for you. W6EOS is still building the xtal xtr. The P. A. T. club had their semi-annual banquet and all had a fine time eating and dancing. Those present including the OWs and YLs were W6AJM, W6CTR, W6HY, W6DNS, W6BFB, W6EOP, W6FP, W6DAI and W6EOL.

Traffic: W6ANV 212, W6EOP 15, W6CTP 12, W6AEP 5, W6BGL 5, W6EPF 4, W6EPZ 3.

ARIZONA — SCM, R. Shortman, W6BWS — We welcome a new man to the gang in the person of Bob Lockhart, Jr., of W6EEB and W6ECW from Los Angeles. He comes to Arizona to take up duties as second operator at KGSI. W6DTU leads the state in traffic. W6ALU operated by W6CDU is second. W6BJF reports two new hams in Phoenix: W6COI and W6PK. W6EFC is on the air every night after 9 p.m. W6EAA reports moving to a new QRA one block from W6DCQ, and W6DIE one block in the other direction, and says "Sweet QRM" Hi! W6EOF has been having lotsa fun trying to learn Morse since KTAR became NBC. W6DRE reports a new 4-tube a.c. receiver that is the "berries." W6DJH is dismantling for a while, and plans on a 250-watt crystal using 3500 ke. fone. W6DGN reports that the Doc sent him to Los Angeles for the summer. W6BWS-W6VV is still giving the YLs a treat with his new Ford (Ahem) and says that, W6EEB-W6ECW, his new second operator at KGSI, is the proud possessor of his Ford's twin sister. W6ANO is still keeping silent about his activities in Flagstaff. W6DT wants sked East for the summer.

Traffic: W6DTU 282, W6ALU 268, W6BJF 67, W6EFC 34, W6AWD 18, W6EAA 1.

LOS ANGELES — SCM, B. E. Sandham, W6EQF — It is with sincere regret that we learn of the death of W6ZH. We will surely miss him and the section's sympathy goes to his mother. It seems fb to be back on this job again after a hard trip to Mexico City via automobile with an expedition and I.P.H. The following make the BPL — four of them making it both ways: W6QP, W6BZY, W6WA, W6DEP, W6AOA, W6AWY, W6EGH. W6QP heads the list with six skeds. The section's message total is 3309. W6AKD worked J1ZB on 28 mc. on June 8th. The Tri-County Club sponsored the quarterly banquet held June 7th at Pomona with over 100 in attendance. W6DEP tells us of a new ham coming on at Pomona with xtal. W6AWY has a good sked with Hawaii which puts him in BPL. W6EGH says 95 per cent of his large tfe total was handled with foreign countries. W6AKW missed the BPL for the first time in many months due to his Philippine contact closing down for three months. W6EAF renewed his code transmissions for beginners. W6ETJ, the new Chief Route Manager, is a live wire and can provide skeds for you. W6DAK is resuming sked with KAICE and states that W6DH is coming back on air after two years' absence; welcome, and don't forget your tfe report, OM. W6DVA is rebuilding with xtal. W6TE is busy at college. W6EN took portable to Santa Cruz Island (YL) and handled 46 messages. W6AVJ is waiting for his 1-kw. water cooled tube to be repaired. W6ESA has rebuilt entirely. W6BGF is using low power fone. W6BUZ is also using fone. W6BJC sends in his first report and reports new club at Santa Monica. FB. W6OF sends in list of 1930 and prehistoric sigs. W6DZI complains about his plate block going up in smoke. W6AM has new QRA and is utilizing two 90-foot telephone poles. W6FJ is working nights in talkies at Hollywood hence low total for once. W6COT deserted 14 mc. for 7 me. W6CUH was heard in Switzerland and worked 45th country. W6EEP is a member of the new Santa Monica Wireless Club. W6ACL will soon be on with xtal. W6LN is busy at KFOX but promises tfe total soon. W6ERL is rebuilding with S52. W6ID is having trouble with new a.c. recvr. W6BVZ has weather-vane note and gets different QRI with each QSO. Two former Navy ops have put W6WV on the air on 3500 ke. W6BZY is in Chicago for a few months. W6AWP is going East with portable. Bakersfield news comes thru W6AOA this month: W6ETN is rebuilding. W6ENQ is still working on new shack. W6DQV is working good DX. W6ABI is trying push-pull with xtal. W6ENH is being married. Best of luck and hope she becomes a YL opr.

W6WA is still high man there with PI tfe and consistent skeds. W6AOA is building new power supply for PDC note. W6AOB is working for comm. ticket. Practically all of the Bakersfield Club belongs to the Naval Reserve and will be operating at Naval shore stations and ships very soon. The A.R.R.C. membership and attendance is growing. Code class is in session before meeting and lectures are in progress for those working for comm. ticket. The Long Beach Club continues strong and is promoting a trip to Santa Cruz Island. The Pasadena Club were guests of the telephone company and shown through the plant.

Traffic: W6QP 637, W6BZY 416, W6WA 300, W6DEP 269, W6AOA 257, W6AWY 241, W6EGH 199, W6AKW 130, W6DQV 103, W6EAF 69, W6ETJ 68, W6DVA 51, W6DAK 55, W6DLI 55, W6TE 47, W6EN 46, W6AVJ 46, W6AWP 34, W6ESA 32, W6BGF 31, W6AOB 31, W6ENH 25, W6EQF 19, W6BUZ 15, W6EAU 14, W6CXW 14, W6AGR 13, W6BJC 11, W6OF 11, W6DZI 10, W6CZT 10, W6ENQ 10, W6AM 9, W6FJ 8, W6COT 6, W6CUH 5, W6AZL 4, W6EEP 3, W6AKD 5.

NEVADA — SCM, Keston L. Ramsey, W6EAD — W6CDZ leads in traffic this month. W6UO is still active with Army-Amateur skeds. W6CRF is all hot for 3500-ke. phone. The Nevada Amateur Radio Assn. is going strong. All active amateurs please drop your SCM a line and let the rest of the world know Nevada is on the map.

Traffic: W6CDZ 55, W6UO 11, W6EAD 4.

HAWAII — SCM, L. A. Walworth, K6CJB — The following appointments were made in getting new machinery in operation: Official Broadcasting Station, Route Mgr., Official Observer, K6EWB; ORS appointments, K6CIB, K6ALM, K6ERH; Official Observers, K6ERO, K6DYC, K6DUD, K6DQQ and K6CIB. Sgt. J. C. Bailey of 'EWB edited *Ham-Aloha* for June and the boys say he is "past master of printers." The A.R.R.C. of Los Angeles is the first exchange list for our paper. K6DUD is a very active new station and will keep some older stations working to keep ahead. The Lahaina Lungs Ham Club is publishing an Amateur Call Book of Hawaii. K6SH gladdened the heart of your SCM by donating a nearly complete file of *QSTs* beginning with 1922. These are being bound for permanent files to go with the office of SCM. K6DV boasts six new hams. Interest is increasing in 3500-ke. fone and 28-me. CW. The congestion of the dx bands is forcing us to turn to 3500 ke. for inter-island work. ZL3AI says he likes *Ham-Aloha*. K6CFQ, former SCM, sent special radio from Aberdeen, Wash., to send him *Ham-Aloha* regular as it's good reading while at sea. K6AVL and K6BXW are leaving for Calif. All unlisted Hawaiian stations will receive all QSL cards addressed to K6CIB, whose call is correct in the Amateur Radio Call Book. Your SCM heard a big buzzing lately during a CQ and wondered what had gone west this time. It was only a swarm of bees, so he took 'em in reporting three stings. Fifteen stations reported with message total of 2097. When we find our stride, that Ka gang and W6 bunch will look like 30-cent roast dog.

Traffic: K6EWB 1036, K6DUD 305, K6BXW 291, K6DQQ 124, K6DV 118, K6EVW 73, K6AVL 68, K6BOE 27, K6CIB 26, K6ACW 8, K6BJJ 8, K6ERH 5, K6ALM 4, K6ACR 3, K6ERO 1.

ROANOKE DIVISION

WEST VIRGINIA — SCM, Don B. Morris, WSJM — The following hams lose their ORS tickets because of failure to obey the rules of an ORS: W6SP, W6CLQ, W8DCM and W8ACZ. W8CBV and W8BWK, both of Wheeling, are new ORS stations. W8DPO was winner in Third International Contest for this section. W8HD is going to Europe in July for his vacation. W8CDV's 203-A went "West" after five years of service. W8ACL, ExSBR, passed commercial and is going to sea. W8JM had pleasure of meeting W8HD, W8BUV, W8ATE, W8TI, and old 8WR during the last month. C'mon, Gang, shoot those reports in on the 16th please.

Traffic: W8HD 39, W8DPO 20, W8JM 15, W8CLQ 11, W8CDV 9, W8CBV 5, W8BCN 3, W8AYI 1, W8BTW (May.) 8.

NORTH CAROLINA — Acting SCM, John F. Bivins, W4AEW — The section will regret to learn of the resignation of Hal S. Justice, W4TS, as SCM of this state. We hate

to lose Hal and hope that he will still continue to lend us his moral if not material help. Yours truly will pinch hit until a new SCM is elected. W4ZB was visited by lightning with disastrous effects to his 210 tube. W4AEW is still sweating over the xtal. W4JR is getting a lot of kick out of the AA net. W4AA reports a lot of activity in Greensboro with several new stations on the air. W4DW has recently been appointed NCS for N. C. W4TN is home for the holidays and checks in for active duty. W4AHH had a lot of tuff luck with his antenna and receiver lately and seems about "regusted" with the works. We are glad to welcome W4ABV back on the air after an absence of a few months. It seems that the gang is going commercial as the following have recently acquired commercial licenses: W4AIW, W4AJL, and W4ABV. W4OC is now the proud owner of an Amateur Extra First ticket. W4AAU sees make way for his new xtal set.

Traffic: W4ZB 83, W4AEW 66, W4AHH 10, W4JR 9, W4TN 4, W4ABV 2, W4TS 2.

VIRGINIA — Acting SCM, Ted P. Mathewson, W3FJ — Director Gravely of W3BZ visited the Richmond gang. W3CA is still working hard on his transmitter. We extend our sympathies to W3ZA on the loss of his brother. W3CKL is taking his ham outfit with him to N. Y. C. where he is taking a new job. W3KG and W3BGS are together now using a UV202. Come on back in W3WO, the QRM's the best ever. W3BDZ has completed a new receiver. W3AHW keeps a tri-weekly sked in Morrison, Va. Hi. W3MT is working in Quincy, Mass. W3IQ promises us great things from the Mrs. pantry. W3AJA sends in a new report for the gang down his way. W3APT has a fine traffic report. McDonald of W3ARU is now in Pa. behind W8CUD. W3HY is working at NKF and helping Hunton keep W3AG on air. W3HO is with the Gen. Motors Radio in Dayton, O. W3TJ visited W3BZ and had a nice gabfest with Gravely. W3ASA is putting 200 vits on two 50s and it perks fine. W3AEV is pursuing an MA degree at Duke Univ. W3FE met some of the Toronto gang on his visit up there. W3ALL and W3BCI are new hams in Richmond. W3AAJ, W3NO and W3FJ urge you to route your traffic via Richmond. W3AAJ will soon be on with a 250 watter. Oh! Oh! The SCM appreciates the way you fellows came across this month. Let's all plan to attend the State Convention in Richmond in September.

Traffic: W3AAJ 56, W3APT 60, W3ARU 12, W3HY 12, W3AZK 12, W3AG 18, W3ALS 13, W3AMB 9, W3ASA 8, W3ZU 3, W3AEW 2, W3NO 6, W3AJA 2, W3ABC 8, E3FJ 54.

ROCKY MOUNTAIN DIVISION

TAH-WYOMING — Acting SCM, C. R. Miller W6DPJ — Very few stations report traffic this month, only two ORS reporting. There are several active non-ORS in the section who do not report. Let me hear from you, fellows. The section needs your support. W7AAH has been working 12 to 13 hours a day, but reports a good total. W6DPJ is operating as W6ZZZ for the summer. W6DPO, whose ORS was cancelled by request, continues to report. W6EKF is using fone on 3500 kc. W6DWH of Stockton reports his crystal control working fine. W6BTX is studying in California this summer.

Traffic: W6DPJ-ZZZ 111, W7AAH 27, W6DPO 23, W6EKF 3.

COLORADO — SCM, C. R. Stedman, W9CAA — W9CAA is moving again. W9CDE is busy examining firemen for promotion on the railroad. W9CLJ says his ticket expired, so he hasn't been on the air. W9CSR is busy de-erating the house and car. W9EDM is at the National Guard Camp now and will be going full blast soon at the Boy Scout Camp with a portable. W9EFP is busy with farm work. W9EAM says fishing is fine. W9CAB is on the air now.

Traffic: W9CLJ 1, W9EFP 1.

SOUTHEASTERN DIVISION

ALABAMA — Acting SCM, Carroll Kilpatrick, W4AHR — W4AHP, our SCM is at the C.M.T.C. in Anniston. W4AG is afflicted by hot weather. W4AKM has been off the air lately. W4AAH is building an MOPA. W4LM is putting out a strong signal on 7009 kc. with xtal control. We welcome W4JY back after an absence of seven months. W4TI is still very active in the AA net. W4DS is

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as his until a with ating AA with been days of tuff about come months. owing AIW, of an or his JR 9, W3FJ gang. extend CKL a taking ever. keeps a gang in the gang onald working HO is panted SA is EV is one of 3BCI W3FJ J will cicates 1 plan mber. Y 12, ASA 8, BC 8,

Miller this several let me report. summer. tues to VH of 6BTX CO 23, AA — fire ticket deco Guard Scout work. now.

4AHR Annis M has 1OPA- th xtal I seve 4DS is

punching the ether with his 201A. W4DH is building a new xtal set. W4IA is back in Selma for the summer. W4AP is troubled by local QRM. W4AJR has just been made Alternate C.S. for the 1st Alabama area of the AA system. W4AKB is rather inactive due to interference from the YL's. W4AAQ is contemplating buying a xtal. W4AHR is working at the local swimming pool. W4ZI reports the organization of the Troy Radio Club. W4LT is on 14 mc. most of the time now. W4AIZ is on in Dothan.

Traffic: W4TI 25, W4LM 22, W4AHR 12, W4AHP 3, W4AQ 33.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES — SCM, M. S. Alexander, W4RZ — Hot weather and vacations have taken their toll of the traffic and other work in this section. W4AJH says he can't hear any hams in Atlanta. W4SS has requested an ORS appointment. J. W. Rickman reports that due to the death of his brother in a distant state he has not been on the air for some time. We take this opportunity to extend our sympathy to W4JL. CM8UF down in Cuba reports that he has received his W.A.C. Certificate and also reports that he made the highest score for Cuba in the February International Contest. Great work, OM. W4GT is a newcomer in Augusta, Ga., and we welcome him. W4AFQ has been busy preparing Augusta's broadcast station for its opening. W4ABS of Ft. Benning, Ga., says that the station there will be on the air the year around and he expects to use all frequency bands possible.

Traffic: W4AJH 15, CM8UF 1, W4SS 21, W4JD 31, W4AA 22, W4PM 377, W4KV 81, W4ABS 42.

PORTO RICO-VIRGIN ISLANDS — SCM, E. W. Mayer, K4KD — K4ACF handled a few as well as worked DX. K4AKV reports good DX but no traffic. K4KD wins another contest and you fellows let him get away with it without turning a hand. K4AN is the lone delinquent ORS this month. Once more and you're out, OM. You fellows can probably figure out why this report is so short. It's up to you to turn in the news, otherwise we have no report.

Traffic: K4ACF 6.

FLORIDA — SCM, Harvey Chafin, W4AII, W4PAW — For the second consecutive year the Jacksonville Naval Communication Reserve Unit has been awarded the Lee cup trophy for maintaining the highest degree of efficiency during the year in the Florida area. The first report this month was from W4AGB in Jax, a YL operator. Congrats, Miss Hardin. Florida welcomes all new amateurs. W4II is operating the Naval Reserve station at Tampa. W4ACM handled a few mssgs. this month. W4JO in Miami is keeping the Naval Reserve schedule from Section Three. W4BG has been doing some fine "DX" this month. W4JH has a new 75-watt xtal transmitter on 7 mc. W4SK was in Tampa this month. W4MM says he is putting 520 watts on his 50 watter. W4GV is keeping his Army-Amateur sked every Monday night. W4WW and his brother have gone to Detroit, where they will stay until next fall. W4ALH says the weather is giving too much QRM lately. W4AFT sends in his second report with a good total. W4AKW is going to school seven hours a day and does not get much time for radio. W4QL has a new portable call, W4ZZA. W4OZ says the Naval Reserve station is enlarging its membership every month. Last month's QST has the call W4AFL. It should have been W4ALF. W4TG says he is thinking of installing xtal. W4QN has rebuilt his Schnell receiver like W4AIU's. W4ADP is still thinking of building that push-pull transmitter. W4OK reports for W4ABK and W4AIF. They all promise a larger report next month. The following ORS appointments will be cancelled if your report does not come in this month: W4IE, W4CK, W4CH, W4SD and W4DD. W4QV is on the air with his fone set again. W4AGR is changing his 14,000-ke. fone to 3500 ke. Send in a report, fellows, so we can tell the gang what is going on within our section. My QRA can be found on page 5 of this QST.

Traffic: W4ACM 123, W4QV 93, W4JO 78, W4AGR 75, W4ALH 66, W4TG 34, W4BG 57, W4QL 51, W4GV 38, W4SK 32, W4AGB 29, W4AFT 28, W4ADP 28, W4OK 25, W4WW 22, W4QN 14, W4OZ 14, W4AIU 13, W4ABK 12, W4AFN 12, W4AKW 8, W4MM 8.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5RJ — W5HY leads this month. W5BIP, a new ORS, turns in a good total. W5WW has a new receiver. W5BBF reports a new station, W5BLN, in Nacogdoches. Welcome, OB. W5ASP, another new ORS, has a fine total and is relief op at KGKO. W5BAM has been on vacation as dropped in on W5JC and W5UX in the rounds. W5BG has a new S.G. receiver. W5ARV, another new ham, shows wp. W5BGW has a d.c. note now. W5AAE is still pounding out a few. W5JV is also putting in xtal. W5BLU, also a new one, is doing fine. W5CF blew a grid leak and a 210 but handled some. W5LY reports a new station, W5ALA, in Dallas. W5BAD is working for W.U. at Dallas and will be on with portable W5AJS. W5GZ graduated from school. W5RND has rebuilt. W5AZP can't get on the air it seems. W5RJ has finally got the big xtal job going. We need a Route Manager who can handle the job, also another efficient Official Observer. If you can handle either of the above, let me hear from you at once. The Fourth West Gulf Division Convention will be held in Houston. Plan to attend.

Traffic: W5HY 56, W5WW 38, W5BIP 39, W5BBF 25, W5BAM 16, W5BG 15, W5BAD 12, W5ARV 15, W5BGW 14, W5AAE 8, W5JV 6, W5GZ 6, W5BLU 5, W5CF 4, W5LY 3, W5ASP 24, W5RJ 4.

SOUTHERN TEXAS — SCM, Robert E. Franklin, W5OX — I am sorry to report that the A. & M. College station, W5AQY, will be off the air until school starts again in September. Bill Evans, W5EO, was elected Club Pres. of A. & M. for the next term. Congrats, OM. W5BKW is pretty busy as Secretary of Houston's new radio club. W5EI has just been appointed Route Manager for this section succeeding W5TD. Get in touch with him for skeds. W5UX has two transmitters, one on 14,000 kc. and one on 7000 kc. W5AB reports activity slow out his way. W5GZ reports for Galveston as follows: W5AOC is doing BC work but expects to be on with a new transmitter soon. W5BBL has a pair of 112's in a push pull rig. W5AFF is using his portable until he can get his xtal controlled 860 going. W5ZG reports his new Zeppl working fb. W5MS is to be congratulated in that he has just received notice that he won the Third International Contest Certificate for this section. FB, OM. The Corpus YL, W5BKG, has been showing the OM's how to work real dx, having wkd Portugal and Aust. this month. W5ALV is a brand new "Ham" in Corpus. W5ZX is YL-struck hi! W5AHZ is having trouble making his a.c. receiver work. BC work has been keeping W5MX busy. W5TO is op at a BC station in Corpus. W5ATY, another new reporting "Ham" in Corpus Christi, is using a UX250 with 450 volts from a "B" eliminator in the old stand-by TGTP. W2ALD, who is working for Shell Oil Co., out of Houston, has a new portable call, W5AOJ. The Houston Radio Club is in full swing again with a very good attendance. The officers for the coming year are Robert E. Franklin, W5OX, Pres., Jim Hunt, W5TG, V.-Pres., Leo Havard, W5BKW, Sec. and Treas. We want everybody to come to the fourth West Gulf Convention to be held in Houston. There are a lot of nice things planned. Make your plans now. Send in your reservations to W5OX or W5BKW.

Traffic: W5AQY 91, W5BKW 43, W5EI 30, W5UX 27, W5AB 22, W5ZG 19, W5AQK 12, W5TD 11, W5AFF 7, W5MS 2, W5ATY 2.

NEW MEXICO — SCM, Leavenworth Wheeler, Jr., W5AHI — A number of stations have shut down for the summer months. W5AJL is building a new crystal control outfit. W5TV is on a three months' vacation. W5JZ is a new station on a ranch eighty miles out of Roswell. W5AHI will remain inactive for several more weeks.

Traffic: W5AJL 42, W5AHI 1.

OKLAHOMA — SCM, Wm. J. Gentry, W5GF — W5AUW is getting an honorable discharge as ORS from the SCM. W5CB is too hot to do much tfe handling. Hi. W5MM is sure going good on 14,000-ke. fone. W5QL is still the ham commercial in Okla. with that power. Hi. W5SW seems to be overworked in the elec. business. W5OJ has our friend Hart Farwell from KFR6 visiting him. W5ASQ, our RM for Northern Oklahoma, is perking right along now. W5VQ reports working WFAT about 1000 miles west of

Panama. W5AAV reports graduating from OU. Fellows, I want to remind you of a FB West Gulf Convention coming soon at Houston, Texas, Sept. 4th, 5th, 6th. Sure want to see you there. W5GF is building a 14,000-ke. set now and is going good on 7000 kc. with a 210. Glad to hear from a new Ham. W5AVG, of Okla. City. Let's have more reports, gang.

Traffic: W5AUV 48, W5VQ 29, W5GF 16, W5OJ 11, W5ASQ 8, W5CB 4.

CANADA

Only a very few reports have been received on the number of messages handled during the Prince of Wales Birthday Greeting Relay. The Quebec boys made a fine record for their division and their SCM should be proud of them. G5ML was on the receiving end and copied twelve messages from Montreal. I would be very pleased if all those who took part in this relay would report direct to me, so a complete check could be made and a letter of thanks forwarded to the RSGB for the part they played in the Relay.

Reports from all Canada are greatly reduced this month. Old man static must be getting in his work, as he is reported the chief offender. Come down on 14 mc., boys, and try Wednesday nights for Canadian contacts.

Your CGM would be glad, if you intend visiting Montreal during your vacation, to have you call on him. Telephone Harbour 5151 and visits to local stations will be arranged.

CANADIAN GENERAL MANAGER
ALEX REID, VE2BE

QUEBEC DIVISION

QUEBEC — SCM, Alphy Blais, VE2AC — Through the efforts of our CGM we are welcomed to do 'phone work on 14,100-14,300 kcs. under certain restrictions. VE2BE is working DX and handling traffic in spite of all the CGM work. VE2AC is back from his honeymoon. VE2CA has a 28 mc. sked with VE2AU. Congrats to VE2AP who got his B.Sc. degree. Mrs. VE2CA pounds away as ever. Our old faithful VE2BB is handling traffic and has a fine d.e. note. VE2BE got in a new tank condenser. VE2BH is using xtal on 7244 kcs. VE2BG is going to put up new fuy-wires if the fellows will give him a hand. VE2BB had a visit from W2BY, a YL operator. Hi! Hi! Two new men join us this month: Crooker, VE2EM and Bonnett, VE2EY in St. John, former VE4EV. Welcome Boys. Pleasant vacations to all.

Traffic: VE2BE 28, VE2AP 8, VE2BG 7, VE2CA 5, VE2BB 12, VE2AC 23, VE2EM 5, VE2EY 2.

ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE3FC — VE9AL is still maintaining his two regular schedules, and holds his lead in traffic totals. VE3GR is active on 3500 kc. VE3GT says that ZL and VK come through FB in early mornings. VE3AD is hitting the trail with a 7000 kc. portable to Cedar Wild Hotel in Miskoka. VE3XC used 14,000 and 3500 kc. during the month. VE3DW is still plugging away at Beamsville with fine results. VE3FC is experimenting with AC tubes on high frequencies. Northern Dist: G. V. Lawrence, VE3ET, Acting SCM — VE3HU shot the 50 but will soon be back on with an 852 and a pure DC plate supply. VE3BG lost one of his 50 watters. VE3HD continues to bat 'em out. VE3ET met VE3AX and is looking forward to a visit from him and VE3BG. VE3BH will soon have some B Batts. for his 210. VE3DM's new TNT is perking FB with a 201A. VE3AR has a terrible noise in his receiver. What happened to VE3AG, VE3BD, VE3CO, VE3CR, VE3GC, VE3GD, VE3GG, and VE3KB.

Traffic: VE9AL 17, VE3GT 13, VE3GK 10, VE3XC 5, VE3DW 2, Northern Dist: VE3HU 6.

PRAIRIE DIVISION

MANITOBA — SCM, A. V. Chase, VE4HR — VE4FX, whose QRA is Fort Churchill, Man., was in Winnipeg recently. VE4DK has gone to Camp Borden for a further course in flying. VE4BU found it impossible to operate his set this month on account of bad QRM. A newcomer has started up in Winnipeg using the call VE4AG.

Traffic: VE4DJ 8, VE4HR 3.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — The Regina gang are planning a convention to be held in Regina on August 1st. VE4BB managed to squeeze a few messages through. VE4IH reports. The rotten WX has put a crimp in the activities of VE4GR.

Traffic: VE4BB 5, VE4IH 1.

VANALTA DIVISION

ALBERTA — Acting SCM, G. E. Panter, VE4AF — Fred Barron, our SCM, left the first of the month for Waterways and requests the gang to listen for him at 4HI-HJ. During his absence please send your reports to VE4AF, 25 Richardson Bldg., Edmonton. VE4HG is back with us again as 4BW with a TGTP outfit and promises big things. VE4DZ has a portable transceiver under construction which he will have with him on his holiday tour across the continent. VE4HM is experimenting with receivers. VE4EA reports a brace of cards from Zedders and a heard card from an Aussie. His brother is second opr. now. VE4AF has a combination 30-watt xtal and 250-watt TGTP. VE4GD and VE4BQ were visitors in Edmonton on the 24th of May. VE4BQ recently moved to Calgary, where he is setting up a 200-watt oscillator and 250-watt power amplifier rig. VE4GD has just completed rebuilding his xmitter and is now using a TGTP and VE4BQ says it's hard to beat for a beautiful job. FB. He writes to say that VE4CG and VE4DX are newcomers on the air, and VE4CJ and VE4CY are back with us again. Looks like Calgary might rival Edmonton again with active stations.

BRITISH COLUMBIA — SCM, J. K. Cavalsky, VE5AL — VE5AK has been off all month. VE5BM is back on sked with VE5GT. VE5DR has moved to Powell River. VE5BC is talking super het and a high-power transmitter. VE5CR is on regularly now with a very nice signal. VE5CF is on more often. VE5FI is experimenting with push pull detectors and AC tubes. VE4EI and wife are visiting Vancouver with VE5AH. VE5AL has had several qso's with ZL and VK stations. VE5AC still finds time to handle the odd message. VE9AJ pulled off some snappy relay work recently. VE5BR wants a 3500-ke. sked with someone in Vancouver. VE5GT at Prince Rupert says he is the only active station there just now. VE5AW in the Yukon is still leading the DX hounds.

Traffic: VE5BR 1, VE5AC 7, VE5AL 21.

MARITIME DIVISION

NEWFOUNDLAND — Acting SCM, E. V. Jerrett, VOSZ — VOQH paid us a visit and has a very interesting layout on board. Good luck to Manley. VOSAE will be operated all summer by a ham from Princeton while McNeil goes north. VOSAN reports a brand-new transmitter with a pair of 852s. VOSMC is doing some reporting for the RSGB and wants some reports from the gang. VOSAW can be found most every evening on 14,000 kc. VOSWG will be kept going this summer by a volunteer ham from U.S.A. VOSZ spent an interesting hour on board the Morissey looking over VOQH.

LATE AND ADDITIONAL REPORTS

KA1HR is keeping seven schedules.

Traffic: KA1HR 697.

XC 5

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Calls Heard



**W5AYL, Ed Oldfield, 1415 N. Kleim,
Oklahoma City, Okla.**

vk2dy vk2jc vk2jt vk2hm vk2ns vk2dj vk2sg vk3bw vk3es
vk3hl vk3pt vk3rg vk3zx vk4eg vk4mf vk5hp vk5it vk5ld
alifl zl2ab zl2ba zl2gl zl3bb zl4aa k4kd k6avl k6bde k6dxw
k6eb k6evw k6erh k6ewb kalem kalhr ve4bm ve5ac ve5du
em2wa x9b

**William Lockerby, Red Sea Patrol, c/o G. P. O.,
London, England**

au4aa au8am et1er et1aa d4em d4gl d4uaw ear94 ear98
ear102 eu1ac eu9ac eu6nn fm5rt f8wrg f8edb f8aja f8gyn
f8wha f8zb f8gi f8rgr f8es f8gd f8dt g2nz g2nn g5zn g5br
g6ts f8olu f8ifa g6wt haf9af hw8ay oh1da oh6ng oz7jo
sp3kk sp3or v8lab wlarg wladb wlawe w1dbs w1lg w2bv
w2ku w2avm w2ard w2bjc w3aws w3aul w3ahp w2af
w3anp w4ft w4he w8et w8drj sm5ua kfzt x8srl xf8tpa
y12gg y12gm z5u z8im f8psc g2cj g5by g6vp w2aj zuf5
au5w

**Clyde Shaw, 213 Holmes St., Youngstown,
Ohio**

7000-ke. band

w6adw w6cie w6ieke w6iasm w6bpo w6exw w6eqz w6dmz
w6os w6icx w6dui w6hm w6ar w6wa w7ya w7aaah w7lz
w7amo k4kd k4dk k6aa k6cbz zl2as zl2ab ac1bd
vk5hp vk2hu vk5hd vk5it xba x29a x28 cm2uf em8ybr
em8le cm5fl em2yb ve4dj nn1nic ear94 kdv5 on4jo

**J. F. Quigley, 645 Polk Blvd., Des Moines,
Iowa**

3500-ke. 'phones

w1aby w2aca w3ej w3cv w4ia w4oa w5awg w5bie w5kx
w6bf w6biu w6brk w6dgb w6kd w7acj w7ant w8ajh
w8azo w8buw w8byr w8cez w8ejb w8ejh w8doc w8dtk
w8rw ve3br

14,000-ke. 'phones

g6is w1aqi w1bjd w1cei w2el w4wg w5ql w6kt w8ekc w8dld
w8rd w8wm w9auh ve3bm x9a

**W2ABY, T. Sirois Jr., aboard
S.S. "American Shipper"**

Heard between New York and London

w1abd w1aep w1agn w1ahb w1akb w1aku w1amb w1anx
w1ape w1bcbn w1bzs w1bvr w1efo w1epi w1fn w1fx
w1id w1lm w1lz w1mk w1pk w1se w2adz w2atz w2bai
w2bft w2bha w2bia w2bjc w2bcs w2cbp w2cvj w2ewk
w2exi w2fk w2jn w2qn w2rq w2rt w2sm w2wf w2wz w3ahp
w3aw w3ba w3bu w3ep w3im w3ln w3pm w3sb w3ut
w4ajh w1alg w4ft w4hd w5hd w5td w6am w8ark w7dd
w7zz w8agi w8alu w8amy w8bx w8bd w8lt w8sh w8pe
w8qb w8agu w8equ w9fuq w9um ene ct1cp ct1cp ct2am
eis8 f8fix f8gdb f8wiz g2gz g2nl g5bd g5dr g6bx k4acf
k4kd n1koo on4uy ve20a ve3gd xearn

W9AV-W9CBS, Douglas Raw, Clearwater, Minn.

14,000-ke. band

lu8dy lu1ba lu4da lu2ca lu4fa lu3pa hc1fg hc1le hc2jm
lu2ms zl2ac zl3cm ce3dg ce2ab oa4j g5ml em5ex py2ik
py1aa py2ba py9fb py1cm py2sb f8gg

**W5AMH, Billie Basden, 215 N. Archer St.,
Groesbeck, Texas**

7000-ke. band

k4kd k4acf hc1fg hc1dr em1by em2jm em5fe em5fl kfr6
kfu5 fkz1 fa1nx ka1em ka1af ka1f vk3jk vk3wz
vk5hg vk5it vk6sa vk6us vk7wi vk7eh nn1nic nn7nic
nneab rx1aa ve2be ve2es ve2ap ve1bk ve4dj ac8rx py1aa
x1j x5a x5z x9a x23a x29a ti2wd

3500-ke. band ('phone)

w4oh w5ive w5apw w9zby

**Warner Chaney (ex-W8GB) Box 17, aboard U.S.S.
"California," c/o Postmaster, Varick St. Station,
New York City, N. Y.**

w1asf w1abn w3dsw w8bnt w1qv w1akg w3anh w3nr
w4suw w4lk w9umw w3utw w2bda w1ft

**W2BIH, C. Brewster Lee, 1329 Teaneck Road,
West Englewood, N. J.**

ef8app f8fk f8pam f8pro xf8wb g6qb g6xn on4fp k4aci
lu4dq xpa0j pa0wx f8gdb f8mst c2ax2 g6t g6xb
on4uu k4ni et1aa su8an kdwt f8ep f8hr f8rrr g5ms g6vp
on4gn earl pylem py1bl nj2pa ox7x nn1nic 8et c8hs f8ko
g5ml g6wy on4gn ear98 py1ca uolkr fvm2fy rwx f8eo
f8jd f8rbv g5rm g6xo on4gp ear98 py5af ye2ab x7eff
nmbx f8er f8lgb f8tsn g4jl g6xj on4jj early lu9dt ok2yd
kfr5 fqpm.

**W4AHQ, Vernon V. Story, Route 2, Box 31a,
Auburn, Ala.**

7000- and 14,000-kilocycle band

w1aze w1efi w1zz w1emx w1daw w1aqi w2ake w2ai
w2jn w2gf w2rs w2baf w2dab w2bfq w2afv w2bk w2atx
w2bn w2akl w2bvg w2bnx w3aur w3alk w3aws w3awr
w3db w6dk w6auk w6eet w6dk w6aoj w6ern w6el
w6dte w6cha w6czk w6efu w6tj w6am w6bau w6euh w6arv
w6aqg w7bb w7rr xf8r5 kfr5 nn1nic nn7nic ve1dm ve3oe
g2av g6mc g2eg g2oq nj2pa ear37 ear47 cb3ab ev3ab py1aw
et1aa cm2jt fqpm ex2ak

W8AVS, D. T. Byram, 43 River St., Homer, N. Y.

14,000-kilocycle band

f8ct f8pro f8ix f8rko xf8wb et1by et1aa ok1mx d4abg
pa0gw xpa0j xpa0z g6bn g5ml g2xv g2l2 g6qb g5ux g2qv
g6wy ce3ac ce3bm celah py2bg py1bl py1aw py2ak py1el

nmbx k4ni k4kd

**W6DTU, F. L. Easter, 1336 E. Monroe St.,
Phoenix, Ariz.**

14,000-ke. band

w1acp w1adz w1bux w1eek w1eje w1emx w1eqr w1eru
w1cri w1d9q w1fk w1ry w1ow w1we w1zz w2af w2aq w2bdr
w2bjl w2bvg w2el w2fp w2gp w2jn w2mb w2tp w3aqs
w3ces w3sh w3ut w3zf zsu w4aei w4eq w4wo w8crs w8dij
w8ke ac8rv ce2ac ce2ab ce2ak ce3ab ce3ac d4akg d4on
f8aap f8ajc f8axac f8bqf f8rf f8sif f8orm f8rko f8rj g5kg g5bs
g5ml g5wk g5qv g6hp g6v g6vp g6wl jxix jxax k6alm k6eat
k6akw ly7al ly7ji ly2nu nn1nic oa4h oa4q oa4o oa4s pk1bh
pk1jr plkum rxfr5 rwx velac ve2bb ve2bh ve4bh ve5bb
vu2kt vu2yx vk3go vk2rv zl2ac zl4ai wfat

Correspondence

The Publishers of QST assume no responsibility for statements made herein by correspondents.



Out-of-Band Policy

Hartford, Conn.
May 13, 1930

MR. W. D. TERRELL, Chief, Radio Division,
Department of Commerce,
Washington, D. C.

Dear Mr. Terrell:

The Board of Directors of the American Radio Relay League was in session in Hartford on May 2nd and 3rd. These Directors, sixteen in number, come from all sections of the country, and in preparation for the meeting had made a thorough canvass of amateur radio conditions in their respective territories and informed themselves on the needs and desires of our members. It had been announced in advance that one of the most important items of business to be considered this year was a consideration of the amateur "off-wave" situation and a study of ways and means to keep amateurs within their allocated frequency bands.

The radio amateurs of the United States consider that the present situation on off-wave operating in the amateur bands is serious and that there is very little excuse for it. Our Directors report that our members in every section of this country are in favor of a more strict enforcement of the penalties of law provided in this matter. Every one of our Directors reports his membership in favor of a program whereunder the law will be demonstrated to have teeth and where, upon establishment of guilt, penalties will be meted out. Amateur radio wants more complete enforcement at the hands of the Department of Commerce, to aid in putting our house in order against the international situation which will confront us at Copenhagen and Madrid, and to protect ourselves against complaints from other United States services. Under the regulating of operator licenses, the Department of Commerce has the duty of thus controlling the operation of stations.

I am instructed by my Board to advise you that it is the desire of the American Radio Relay League that the Secretary of Commerce comply with Section 5 (D) of the Radio Act of 1927, as amended, by immediately putting into effect the policy of suspending the operator's licenses of all persons consistently violating the regulations of the Commission by operating outside the frequency bands prescribed for amateur services.

This office will be pleased to be of any assistance that it can to you in the carrying out of such a policy.

Our Communications Manager has also been instructed by our Board of Directors that, in all cases where the Communications Department of the League acquires evidence satisfactory to it of consistent off-wave operation, he shall forward such evidence to the Secretary of Commerce with a specific request for suspension of the operator's license. From time to time, as data accumulate here, our Communications Manager will correspond with you direct. If you have any instructions to give us concerning such cases in general, we shall be pleased to receive them.

It is earnestly hoped that the Radio Division now has the facilities to give some attention to amateur radio. Although we are to a huge extent a self-policing and self-disciplining organization, it has been so long since amateurs have felt the police power of the government that there is now the widespread feeling amongst the great majority of amateurs who are law-abiding that our activity should not be permitted to suffer from the wanton or careless sets of a minority, and we feel obliged to call upon the government for assistance.

I shall be very pleased to receive your advices, and with kindest regards to you and Mr. Downey, am

Respectfully yours,
— K. B. Warner, Secretary and General Manager

DEPARTMENT OF COMMERCE,
RADIO DIVISION
WASHINGTON, D. C.

May 15, 1930

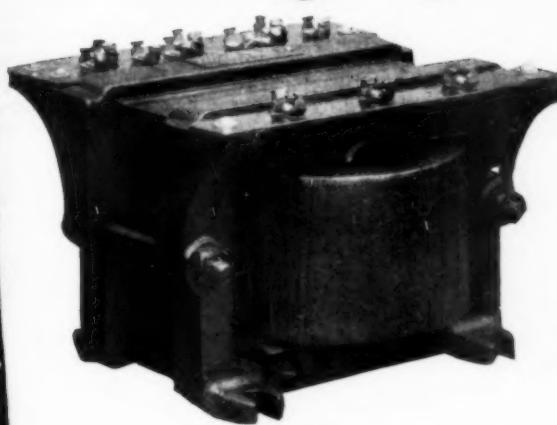
My dear Mr. Warner:

Receipt is acknowledged of your letter of May 13th, in which recommendations are made as a result of your annual meeting, with respect to the enforcement of the regulations governing temporary operator certificates and the penalizing of operators for operating outside of the prescribed amateur frequency bands.

I am forwarding a copy of each of these letters to the Supervisors of Radio, with the intention that such recommendations be carried out.

Respectfully yours,
— W. D. Terrell, Chief, Radio Division

AMERTRAN



Equipment

Designed to meet the new amateur requirements of an adequately filtered D. C. current supply.

Filament Heating Transformers

Type	V. A.	Cycles	Line Volts	Sec. Volts	Sec. Amps.	Test Voltage	Tube
H-4648	12½	50/60	200/230	2.5	5	12,000	—66
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H-4649	37½	50/60	200/230	2.5	15	12,000	—66
H-4650	50	50/60	100/115	5	10	12,000	—72
H-4651	50	50/60	200/230	5	10	12,000	—72
H-4652	100	50/60	100/115	5	20	12,000	—72
H-4653	150	50/60	200/230	5	30	12,000	—72

These Filament Heating Transformers have a voltage regulation within 5%. Note insulation test voltage.

Plate Transformers

P-4656	290/415	50/60	100/108 115/125	2360	0.175	6,000	two 211 two 845
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The above Plate Transformer is designed to deliver 1000 volts D. C. with the average filter. Other Plate Transformers can be furnished upon receipt of specifications giving your requirements.

Choke Coils

Choke Coils for these rectifiers can be supplied.

Amertran Radio Parts have long been recognized as the highest quality. Amateurs who have obtained the best results realize their value. Write for bulletin No. 1066.



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TRANSFORMER COMPANY
172 Emmet Street

Newark, N. J.

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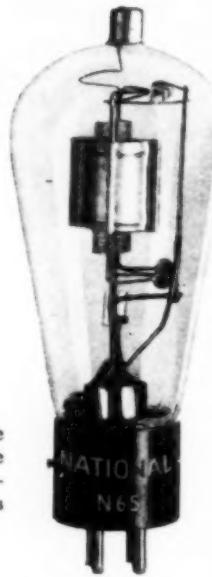
THE NATIONAL SCREEN GRID

• N65 •

An ideal power amplifier tube — no neutralization to prevent self oscillation.

Designed for use as power amplifier — serving equally well as a frequency multiplier.

N65 has lower plate impedance than the average screen grid — plate load impedances are easier to design.



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Fil. Volts.....	7.5
Fil. Amps.....	2.
Max. Peak Plate Volts.....	600.
Max. Plate Dissipation (watts).....	20
Normal S. G. Volts.....	150
Normal Grid Bias:	
As Buffer Amplifier.....	25
As Frequency Multiplier.....	30-60
Plate Resistance (ohms).....	100,000
Mutual Conductance (Ma/V).....	1.
Amplification Factor.....	100

Price \$12.50

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National Radio Tube Co.

3420 18th Street

San Francisco, California

Marine Radio Operating

San Marino, Calif.

Editor, *QST*:

In practically all radio magazines one will find advertisements painting in glowing colors a delightful picture of the life of the marine radio operator. While the statements made are not direct falsehoods, they are sometimes misleading and do not present to the prospective student a representative idea of the conditions actually encountered by the average marine radio operator. For the benefit of those amateurs who are contemplating marine radio operating as a means of making a living, I will try to present, in an unbiased and truthful manner, the conditions that actually exist in that field at the present time.

At least a year of practical experience is necessary before the radio school graduate can be classed as an expert and efficient operator. The Department of Commerce requires a person to copy twenty-five words a minute in Continental Morse and to have at least twelve months' experience in "stations open to public correspondence" before he is permitted to take the examination for a first class commercial license. In order to hold down a job on a passenger vessel it is necessary to have an intimate knowledge of the "Q" signals and operating procedure as well as the ability to copy from twenty-five to thirty words per minute on a typewriter.

Living conditions on board ships vary greatly. Large freighters, tankers, and passenger vessels usually provide their operators with fairly decent quarters, although many of them are not too well equipped with washing or bathing facilities. On smaller vessels, such as "steam-schooners," fishermen, and tow-boats, the quarters are usually far from satisfactory and, in some cases, almost unfit for human habitation. The meals on freighters and tankers are nothing to go into ecstasies over; there is usually plenty of plain, and more or less wholesome food. Steamship companies only allow their stewards from forty cents to one dollar per man per day for rations, so it is evident that there cannot be very much "turkey and trimmin's." There are a number of notorious exceptions, popularly known as the "starvation lines," which skimp on everything, and it is well for anyone to steer clear of these. At sea, nearly all passenger ships serve excellent food and the officers are given the same meals as the passengers, but when port is reached and the paying guests depart, the decrease in quality and quantity of the meals is astonishing.

The salary of a radio operator on a one-man ship will vary from \$65 to \$120 per month, most jobs paying either \$90 or \$105. As would be expected, the aforementioned "starvation lines" are the ones which pay the \$65 and \$75 salaries. There are a few vessels on which the operator, in addition to his regular duties, does the work of a freight clerk or purser and receives as much as \$175. On all except the largest passenger ships chief operators are paid from \$105 to \$150, second

CARDWELL'S

BANNER

PERFORMANCE

The Star Spangled record of Cardwell Condensers stands on a high peak, alone. They have always been the choice when Performance was the prime factor, when human life was at stake, when a condenser was needed that could stand up when the going was tough!

With Byrd over the North Pole—with Dyott in Brazil—with Byrd again making history over the South Pole—what a record!

With the Army and Navy, Signal Corps and the Coast Guard, Used by General Electric and Westinghouse. Are they good enough for you?

Transmitting Condensers for Amateur, Broadcast



The 201-E (2 plates). A taper plate condenser for short wave receivers. The stator plate is adjustable, affording maximum capacities of from 50 to 10 mmfd. Price \$4.

and Commercial uses. Receiving Condensers in a wide range of types and capacities. Order direct if your dealer does not stock. Write for literature.

The Allen D. Cardwell Mfg. Corp.

81 Prospect Street, Brooklyn, N. Y.

“THE STANDARD OF COMPARISON”

BETTER FILTERING SAFER OPERATION AND LONGER LIFE FOR YOUR TRANSMITTER

The filter condenser in the power pack of your transmitter can be made to do more than merely present a capacity to the circuit. It can also act as a very effective protective device for itself and its associate equipment against voltage surges.

In the filter circuit of the radio transmitter, voltage surge effects are present to a considerably greater extent than in the comparatively low voltage filter circuits of a receiver. There are heavy surges due to keying, surges when the plate voltage goes on and when it goes off — surges that have caused the untimely end of many a tube, resistor and condenser.

The Mershon Electrolytic Filter Condenser is SURGE PROOF. Without in any way short-circuiting the power source, it offers a path for the dissipation of the surge (when it occurs) and thus protects its associate apparatus. Immediately the surge has passed, the condenser HEALS ITSELF and continues in normal operation. It cannot create heavy charging surges, such as commonly occur in transmitter filters.

This SELF-HEALING characteristic, together with its LARGE CAPACITY per unit and its almost unlimited life in service, has caused its adoption for filter work by a large number of prominent radio receiver manufacturers.

More than 3,000,000 Mershon Condensers are in use today.

A constantly increasing number of Amateur Station Operators, also, are employing Mershon Condensers in their transmitters. The characteristically Pure D.C. note obtained is attributed to their use.

With Mershon Condensers, at their new low prices — and the discounts allowed Licensed Amateur Operators — you can re-build the filter circuit of your transmitter to one of high effectiveness — at a very reasonable cost.

The booklet "Puncture Proof Filter Condensers" tells how this can be done. It explains the principles of construction of the Mershon Condenser, illustrates its newest developments, and shows the most effective circuits for its use.

A complimentary copy will be sent you on request. Just attach the coupon to your station call card or letter-head, and mail it to The Amrad Corporation, 285 College Avenue, Medford Hillside, Massachusetts.

THE AMRAD CORPORATION
285 College Avenue, Medford Hillside, Mass.

Send me booklet "Puncture Proof Filter Condensers."

NAME.....

STREET.....

CITY..... STATE.....

operators \$70 to \$120, and third (if they are carried) \$60 to \$105. On one-man ships the operators are not required to stand any regular watches. They usually work from three to nine hours a day, listening for calls, receiving press, hydrographic and weather broadcasts, or transmitting traffic. On passenger vessels carrying over fifty persons, including the passengers and crew, a continuous watch is kept and the men are required to work either eight or twelve hours a day. There are still a number of ships having only two men who stand "watch and watch." Apparently some of our leading steamship companies do not believe in an eight-hour day for their employees when they can legally evade giving it to them.

The "popularity and rollicking fun aboard ship" mentioned in some advertisements leads one to believe that radio operators mix indiscriminately with the passengers or take part in their sports and entertainments. Nothing could be further from the truth. Operators are not permitted to speak to or associate with passengers except in the line of duty; nor are they allowed to use smoking rooms, promenade decks, or any other places provided for passengers. These rules are strictly enforced by practically all steamship companies and their violation usually results in the dismissal of the offending operator. As for the "excitement, adventure, and thrills," the writer can only say that he has had five years' experience as a commercial operator and he has not encountered any more adventure than if he had stayed at home; certainly the long, monotonous days at sea are neither exciting nor thrilling.

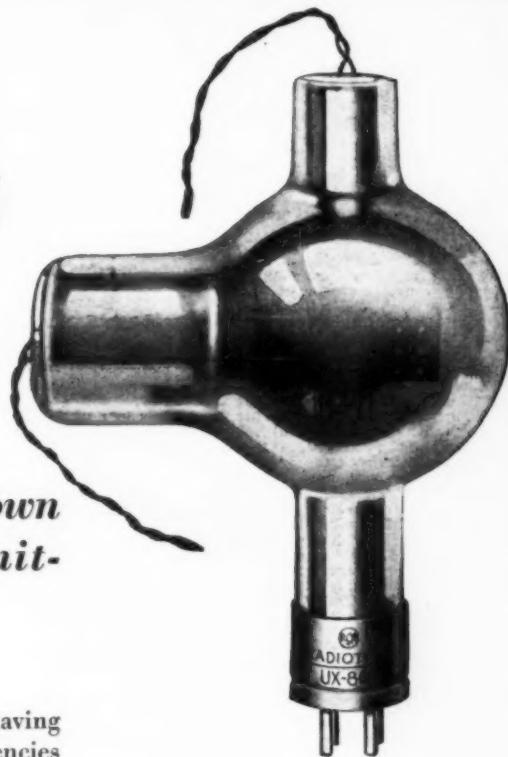
The environment on board American vessels is not particularly conducive to either mental stimulation or the accumulation of many social graces. The mates and engineers, with whom the operators take their meals, are nearly all uneducated, and in some cases almost illiterate, foreigners; their table manners are not above criticism and their conversation is usually confined to lurid stories about women and liquor, or both. On many vessels these officers consider themselves far superior to mere radio operators and treat the latter with contempt.

Due to the competition between radio companies, these concerns do everything possible to keep in the good graces of the steamship owners using their service or equipment. In case an argument arises in which the radio operator is involved, he is placed in a very unfortunate position, because the radio companies will almost invariably uphold the cause of the steamship men instead of helping the operator. Because there is a surplus of operators no one is greatly concerned when it becomes necessary to dismiss one of them in order to preserve peaceful business relations or to keep operating costs down. This competition and their own lack of organization are the chief reasons why radio operators are unable to obtain better living and working conditions.*

* There is, we understand, a shortage of marine operators at present, in the lower-paying positions, because the better-qualified and more industrious operators have landed berths ashore in commercial radio, broadcasting, etc.

RCA RADIOTRON UX-860

*One of the well known
Screen-Grid transmitting tubes*



For the amateur or others having transmitters working at high frequencies (above 3000 kilocycles) this tube will be found advantageous, since its internal shielding obviates difficulties due to feedback and self-oscillation.

This Radiotron is primarily designed for power amplification at Radio frequencies. It is not generally satisfactory as an audio frequency amplifier or modulator, for which purposes other Radiotrons are available.

The user will find Radiotron UX-860 possesses the same rugged construction and performance qualities as the well known UX-852.

75 Watt

Filament Volts	:	:	:	10.00
Filament Amperes	:	:	:	3.25

Instruction book giving further rating and data information will be gladly forwarded on receipt of request giving the call letters of your station.

Firm net price, \$37.50.

RCA VICTOR COMPANY, INC.

ENGINEERING PRODUCTS DIVISION

233 BROADWAY

NEW YORK, N. Y.



Special for This Month

Power Type Crystals	Power Type Crystals	Power Type Crystals
\$5.75	\$5.75	\$5.75

Ground to .1 of one percent precision in the 3500 K.C. (eighty meter band)..... \$5.75
Crystal Blanks..... \$2.75
Crystal dustproof bakelite holders..... \$1.50
Any other frequency, including broadcast bands.
Crystals ground to specifications.

Write for Special Prices

Temperature control box complete	\$50.00
Four only, Exide six volt 250 AMP storage batteries	\$14.75
net; list at	\$60.00
G.E. tumbler switches D.P.D.T.	\$5.50
Jewell pat. 135 0-100 milliammeter, used	\$2.45
Rectobulbs mercury vapor 281 new type list \$7.00 net	\$4.50
Large mercury vapor net—R3, prepaid to your door	\$10.00
Telexplex with four tapes (used)	\$12.00
R.E.L. 50 watt sockets	\$1.40
R.E.L. 204A pair sockets, a pair	\$3.00
Sangamo 5000 volt mica condensers .00025, .0005, .001, .002, List \$2.00. Net	\$1.20
Victor power trans., supplies filament for four 226, one 227, one 280 and 250 volts plate	\$2.50
Western Electric shielded five wire cable, per foot	\$4.40
Esco 350 volt 370 mill motor generator used	\$25.00
Samson 3000 ohm phones	\$2.25
Gen. Radio stand off insulators	\$1.12
New type National .00023-6000 volt transmitting condensers with velvet vernier dial list \$25.00, special	\$13.00
Unmounted Splitdorf fil. trans. with foll. voltages, two 1½ volt, one 2½ volt, and two 7½ C.T. fil. windings, special \$1.45	
10,000 ohm wire wound grid leaks ¾" x 6", 50 watt special	
25 Only U.X. 281s tested and guaranteed to function, while they last	\$8.85
Signal Corp 3/16" silver contact key	\$9.95
Also aluminum panels and corner strips for any size cabinet	
Flechtheim 1500 volt porcelain insulator, 2 mfd	\$4.50
Flechtheim 1500 volt porcelain insulator, 4 mfd	\$7.00
Used Mershon condensers	\$1.75
New National 3000 volt cond. .00045 with velvet vernier dial	\$9.50
Jefferson 300 volt center tapped trans.	\$1.65
Pilot D.C. super wasp kit	\$26.50
Pilot A.C. super wasp complete with pack	\$45.00
Allen-Bradley Radiostat new type "500 Watt"	\$5.50
Silver-Marshall coil forms	\$3.90
Wire wound 5000 ohm grid leaks	\$3.90
Freshman 375 volt not center tapped and two 7½ center tapped filament windings	\$1.95
Signal high frequency buzzer	\$9.95
No. 12 solid enameled aerial wire \$9.95 a hundred feet. Two hundred feet coils	\$17.95
Thordarson key click filter chokes 1½ Henry 200 mill	\$2.95
Latest amateur call books	\$8.85
Used Western Electric 212D, 250 watters	\$35.00
Sockets for same	\$9.00
Slightly used UX 851 1000 watt	\$17.75
Slightly used R.C.A. 2118	\$17.00
Slightly used Western Electric 211A, D, or E 50 watters	\$15.00
Slightly used 204A	\$50.00
R.C.A. UV 217A	\$7.50
R.C.A. UX 866s	\$11.85

Here's the Real Buy

Limited quantity new original cartons

Gold Seal UV 227	\$.89
Gold Seal UX 245	\$1.15
Gold Seal UX 280	\$1.05
R.C.A. high mu 240	\$1.00
R.C.A. voltage regulator UX 874	\$3.25
Broadcast Microphone cases	\$2.25
Thordarson 400 volt, each side center 150 watt	\$3.90
Chemically pure aluminum, sq. ft.	\$.65

Include postage with all orders

Moved to larger quarters. Visit our radio

shack when in town. Good time assured

What have you for sale or trade?

We carry everything for the Ham

MORE FOREIGN TRADE SOLICITED

Write for free Ham sheet

UNCLE DAVE'S RADIO SHACK

115 No. Pearl St., Albany, N. Y.

Radio operators, especially those who do not have to stand any regular watches, have unusual opportunities for fitting themselves for better positions; they have a surplus of spare time, and conditions are ideal for study. Many waste their time gambling or in reading cheap fiction, but there are a few who turn their leisure hours to good account by studying and preparing themselves to take advantage of the numerous opportunities which exist for the expert in any field. A number of operators have become successful authors, engineers, and lawyers through utilizing their leisure hours for study.

It is my belief that this unrivaled chance for study is the only feature which makes it worth while for the ambitious young man to become a radio operator. Radio operating should be used as a means to attain an end and should not be an ultimate goal. The novice will do well to keep this idea in mind when he considers entering the field.

— Mervyn R. Rathbone, Jr., W6BGJ-KFDT

Five years at sea seem to have fed up our author with foreign travel, but life on the sea and the sight of foreign ports will ever have a thrill, particularly for the native inlander, even if to be viewed through the porthole of a tanker. Or do tankers have portholes? — EDITOR.

Another Angle on the Beginner Problem

Detroit, Mich.

Editor, QST:

Perhaps the experience of one of the greenest of green beginners may be of some benefit to others in a similar position. It should in fairness to the great mass of amateurs be brought home to the fellow breaking in, lest he arrive at the same mistaken conclusion I did.

About two months elapsed between the time a station license was granted and the time the station actually was QSO. During that period exactly seven transmitters and no end of antenna systems were constructed. They appeared to function from every indication ever outlined in the *Handbook* or elsewhere. But no answers. Locals were heard and called day after day, with this adjustment and that, but no QSO. Until, at length, the rather disheartened op (?) arrived at the conclusion that those fellows had forgotten their early struggles and couldn't be bothered answering a feeble chirp originating in the same district. "High-hattin' me," was the way it really looked.

Then the difficulty was located. The station, located in an apartment house, really had a handicap. A well-grounded metal roof was soaking up every speck of radiation obtained — which most of the time wasn't much. At length a high Hertz with a well-insulated feeder turned the trick. And a more cordial, considerate bunch of fellows doesn't exist than those behind the big, sweet notes in the Eighth District!

This isn't important except to warn others: If you don't get your first answers, you must and can look for the reason anywhere except in the hearts of the boys you call.

— Frank H. Pipp, W8BJ

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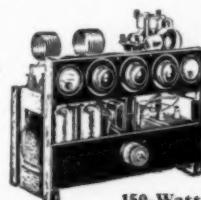
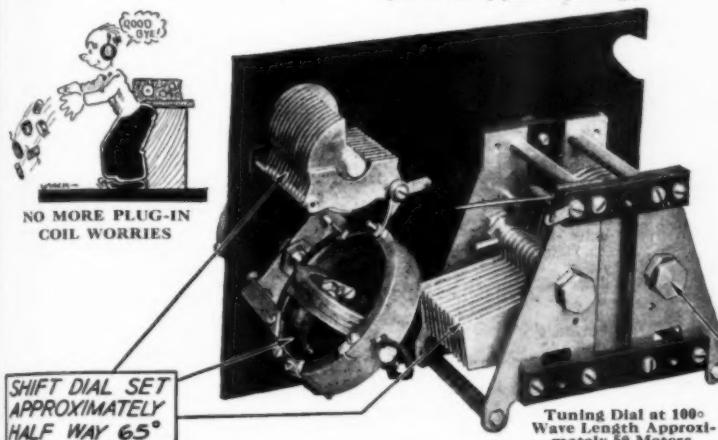
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8BJ

Hoffman & Mix, the well known short-wave experts, designed this AERO SHORT-WAVE Automatic TUNING UNIT

(Protected by patents pending.)



Aero
High-
Power
Xmitter
and

150-Watt Amplifier

For operation on 10-20-40-80-100M. Bands. The first high-power amplifier to use the UX-360 screen grid tubes. New in every detail. 150 Watts of pure D.C. signals with a stability which has caused favorable remarks everywhere. Flexibility that fills every Ham need.

Kit No. 52 — Including the power supply, but not including tubes. List Price.....\$259.00

Kit No. 53 — Less power supply and tubes. List Price.....\$114.00

Aero Built-up Short-Wave Sets.

D.C. Model, Complete.....\$60.00

A.C. Model, Complete.....\$125.00



Only
\$15

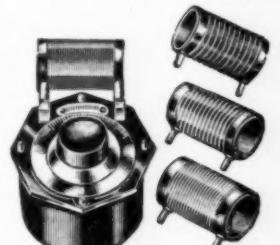
Aero Listening Monitor

Enables any amateur transmitter to check his own note, to know whether it is pure D.C. or not. It is a safe, sure and accurate way of knowing your station without depending upon the reports of others.

Model M-29 Aero Monitor, including Dry Batteries, but no tube. List Price.....\$15.00

Aero Short-Wave D.C. Converter, \$25.00

Aero A. C. Short-Wave Converter, \$25.00



Aero Wavemeter

Using the principle of the "series gap" condensers, and having a definite fixed minimum capacity, the amateur wavelength bands are spread over a greater number of dial divisions. The velvet vernier dial has 100 divisions, each of which may be read to one-tenth of a division.

List Price, each.....\$24.00

Aero Shield-Grid Coils

LWT-11 Kit of 3 coils (16 to 90 meters).....\$11.50

LWT-10 Kit of 3 coils. List..\$10.50

Aero Transmitting Coil Kits

2040-K — 16 to 52 meter kit, \$12.00

4080-K — 36 to 90 meter kit, \$12.00

9018-K — 72 to 190 meter kit, \$12.00

A Marvelous Improvement

NO PLUG-IN COILS

Easiest tuning short-wave receiver known. The tuning unit consists of two controls. The right-hand control, which will be termed the shift control, and the left-hand control, the actual tuning device. In addition to these two controls it will, of course, be necessary to have a regeneration control.

For those who desire to employ it for television or the upper phone band, a special attachment may be secured.

OPERATION

The tuner is operated in the following manner: As a specific example, with the right-hand dial set at nine degrees, revolving the left-hand dial through 180 degrees, you will cover from 19.1 to 22.6 meters. The next step will be to move the shift dial to 1.3 and tuning over 180 degrees, as before, this time covering from 21.9 to 25.7 meters. This process is continued through 180 degrees on the shift dial until you have reached the maximum automatic wave length, which is 90 meters.

You will note that the tuning dial, in the first instance, when tuned through 180 degrees, covers only 3 1/4 meters, whereas ordinarily when using plug-in coils your tuner, when passing through 180 degrees, covers at a minimum of 25 meters. This same speed of tuning is maintained throughout the entire short-wave spectrum, and it is for this reason that this tuning arrangement surpasses any known method. This unit is furnished completely assembled to the amateur, and may be built into either a short-wave converter or receiver.

For those desiring to go from 90 to 200 meters a special device may be had, making its range then from 15 to 200 meters. Net price, \$5.90.

A general chart is furnished with each unit, specifying the settings for the shift dial, which will enable you to approximate the wave length for each setting on the shift dial.

This tuner is not sold through the usual trade channels, but is sold to amateurs only direct from factory at special low net price. Be sure to send post office or express money order for \$19.50 with your order. Shipments will be made in the order received. Be first to order. Attach your money-order to coupon below and mail today — NOW!

AERO PRODUCTS INCORPORATED

611 E. Ravenswood Ave., Dept. 370, Chicago

Dear Sirs:

I want to be one of the first to secure the new Aero Short-Wave Automatic Tuning Unit. Enclosed is money order for \$19.50 which is your low opening net price to amateurs only.

I am also interested in the following Aero Products:

Name.....

Street and No..... City..... State.....



Say You Saw It in QST — It Identifies You and Helps QST



P. R. 822

Fil. Volts - - 5
Fil. Amps. - - 10
Peak Inverse
Volts - - 5,000
Peak Plate
Amps. - - 2.5
Voltage Drop - 15
Overall
Length - 8 1/2"
Overall
Diam. 2 5/16"
Price - - \$18.00



P. R. 866
Fil. Volts - 2.5
Fil. Amps. - 5
Peak Inverse
Volts - 5,000
Peak Plate
Amps. - 0.6
Voltage
Drop - - 15
Overall
Length 6 1/2"
Overall
Diam. 2 3/8"
Price - - \$8.00

UNDER the new regulations all amateurs must use an adequately filtered D. C. current supply.

P. R. 866 and P. R. 872, both mercury vapor rectifiers, besides emitting a wave form easy to filter, furnish a stable source of plate voltage—full load or no load, because both tubes possess a low and practically constant voltage drop. The unusually long life of the P. R. 866 and P. R. 872 is due to the low operating temperature of the oxide coated filament combined with the extremely low voltage drop resulting from their mercury content.

Use these Perryman rectifiers, famous for their rugged strength, in bringing your station in line with the new regulations.

Attractive prices for licensed amateurs

PERRYMAN ELECTRIC CO., Inc.,
4901 Hudson Blvd., North Bergen, N. J.
Enclosed please find money order for \$..... for
check
..... P. R. 872 at \$18.00. P. R. 866 at \$8.00.
Name..... Station.....
Street.....
City..... State.....

Say You Saw It in QST — It Identifies You and Helps QST

FOR PURE D.C. POWER SUPPLY

More Stringent Regulations for 'Phone?

Wheeling, W. Va.

Editor, QST:

In view of the fact that there seems to be much arguing to and fro relative to the 'phone amateur and his rights, I thought I would write a few words to Headquarters giving my sentiments.

I do not believe that anyone should be permitted to obtain an amateur telephone license as easily as they are obtained today. Especially does this hold good for operation on 3500 kc. It must be remembered that modulating signals even at broadcast frequencies is difficult when men are engineers. And then think of the additional troubles when transmitters are set to 3500 kc! Especially when the operators have little or no idea of theory and never intend to study it. If a fellow beginning in telephony would stay on 1750 kc. there would be no need of kicking.

I sincerely believe telephony should never be permitted when the amateur has only a temporary license, excepting on 1750 kc. Operating on the present 'phone band should only be permitted when a first-class amateur license, or higher, is held, except in cases when an amateur is extremely isolated from any town of license examination, whereupon positive evidence of technical ability should be furnished. In the case of c.w. positive evidence of technical ability should be furnished when only a temporary license is held.

I do not think the 3500-ke. 'phone band should be widened. The fact is, as stated above, that the majority of amateurs crying for this concession should never be permitted to use telephony, or if permitted should be on 1750 kc. for lack of technical ability. I even believe the 'phone band should be moved to the upper end of the present 3500-ke. band, retaining its present width, so code stations could work 3500-ke. crystal sets on all three bands.

To substantiate the above, it should be noted that the greatest use of 3500-ke. 'phone is by those who should never be permitted its use. To listen to their poor modulation, poor carriers, poor signals, and poor operating, the whole spectrum would soon be too small for them. I could name a score that know nothing of the principles of amateur radio and who are using telephone, and who do not even know the code. All of these operators have secured their temporary licenses through nothing less than pure perjury.

In other words, I believe that the amateur should be permitted 'phone, but only when he knows how to use it. Regulations for its use should be more stringent than for c.w. because it is harder to operate at the high frequencies. After all good operating is only governed by technical ability, and I am sorry to say a bunch of hams have less than zero. Also in the future, as in the past, the A.R.R.L. should make recommendations that would give the amateur who is really

Crosley Brings NEW Beauty, Originality, Individuality and Distinction to Radio Cabinet Design and Construction

The Sensation at Atlantic City

The NEW Crosley radio receiving sets are NEW in every respect. *New* chassis, *new* power speakers, *new* cabinet designs, *new* cabinet construction, *new* low prices for the big values offered and the super-performance delivered.

Eye-filling beauty, startling originality, distinct individuality, outstanding performance, amazingly low prices—these describe the NEW Crosley sets to the extent that it is possible for words to do so. Actually to see the marvelously designed and executed cabinets, to feel the supreme sensitivity and selectivity of the sets, to hear the astonishingly true tone of the speakers is the only way to gain a full appreciation of these truly exquisite and gorgeous new radio receiving sets. Neither mechanically nor from the standpoint of appearance is there the slightest ear-mark of anything that has gone before.

As an example of the beauty, value, originality and distinction of the NEW Crosley line, look at The CROSLEY ARBITER shown to the right. An electric phonograph and radio combination at only \$137.50! A highly sensitive and selective Screen Grid, Neutrodyne power speaker, A. C. electric receiving set housed in a delightfully designed and executed cabinet—plus—an electric phonograph and pick-up. Never before has such an outstanding value been offered in radio. The beauty of the cabinet is self-evident. The latest type Crosley moving coil dynamic speaker is used. The automatic volume control maintains a uniform volume all over the dial. The tubes required are: Three Screen Grid type -24, one type -27, two type -45, and one rectifier tube type -80. Dimensions: Only 35" high, 23 $\frac{1}{2}$ " wide, 14 $\frac{1}{4}$ " deep.



The PAL
\$69 50
LESS TUBES

Screen Grid
Neutrodyne
Power Speaker
A. C. Electric

An Amazing NEW Electric Phonograph and Radio Combination Sensationally Low Priced



The ARBITER

Electric \$137 50
LESS TUBES

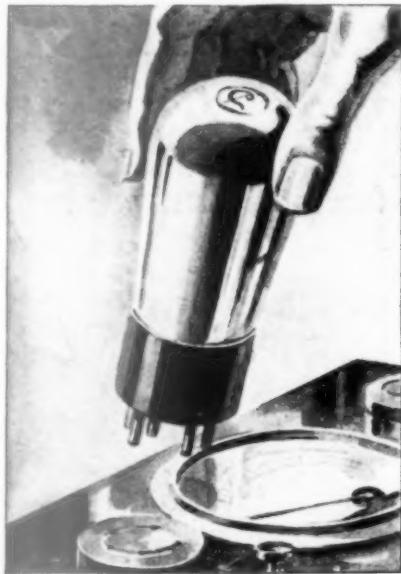
The NEW CROSLEY PAL, illustrated at the left, is another indication of the wonderful eye and money-value to be found in the new Crosley receiving sets. This magnificently beautiful cabinet is only 25 $\frac{5}{8}$ " high yet it houses the Crosley NEW Companionship Series radio receiving set and the newest type Crosley electromagnetic power speaker. The set is highly sensitive and selective due to the use of three Screen Grid tubes. The tubes required are: Three Screen Grid tubes type -24, one type -45, one type -80 rectifier tube. At the amazingly low price at which it is offered, The CROSLEY PAL will be one of the most sensational sellers the radio world has ever seen. Dimensions: 25 $\frac{5}{8}$ " high, 21" wide, 10 $\frac{5}{8}$ " deep. Get in touch with your Crosley distributor today!

The Crosley Radio Corporation
POWEL CROSLEY, Jr., Pres. Home of "the Nation's Station"—WLW
CINCINNATI, OHIO

YOU'RE THERE WITH A CROSLEY

CROSLEY RADIO

Say You Saw It in QST — It Identifies You and Helps QST



The True Test is the Test of Time

Cunningham RADIO TUBES

have met the test
and proved their
faultless overall per-
formance for the
past fifteen years.

Standard since 1915

E. T. CUNNINGHAM, INC.
New York Chicago San Francisco
Dallas Atlanta

trying to operate a good station the preference and chance to experiment to the fullest extent.

This letter is written without prejudice, and my purpose is simply to submit what I believe to be a cure for a growing evil in amateur radio.

— C. S. Hoffman, Jr., W8HD

One for T. O. M.

San Francisco, Calif.

Hi! Old Man:

Father says it takes the Old Man to get a rise out of mother, and I guess for once he is right. Yesterday was Mother's Day, and when my son handed me May *QST* opened to your "Say, Son" page and said "Here, Ma, this is for you," it was the best Mother's Day present I received.

You know, OM, we have moving pictures in our home too, the pictures move to the floor and the frames move to the "shack"; but who cares? The radio mother has long since passed the "why mothers age" stage and keeps in tune with her young hopeful.

When she finds the pilot light missing from the B. C. L. set, she immediately goes to the shack and invariably finds it in the wavemeter.

God bless their hearts, what if we do have to go and buy new paraffin every time we make jelly, and hold our breath when they try to reach the sky, putting a high pipe on top of a clothesline pole. Sometimes I think my son could qualify as a flagpole sitter. Then, again, the hams do not always tiptoe through the tulips, but after radio club sometimes tiptoe through the hall to the shack in bunches, looking for DX, and it is then the radio mother has a tough time holding the OM in bed when his slumbers are disturbed. Yes, the radio mother enjoys the QSL cards and can overlook the days when she picked radio tubes, coils and what not from the dinner table, mantel, and every nook and corner of the house. Believe it or not, watching a real ham start at the bottom and go up is one of the best thrills a radio mother can get.

Well, OM, here is where I have the last word, and Booth Tarkington has nothing on you when it comes to knowing your hams.

Here's to all the radio mothers, *QST* and you, OM (not forgetting the cat).

— A Radio Mother

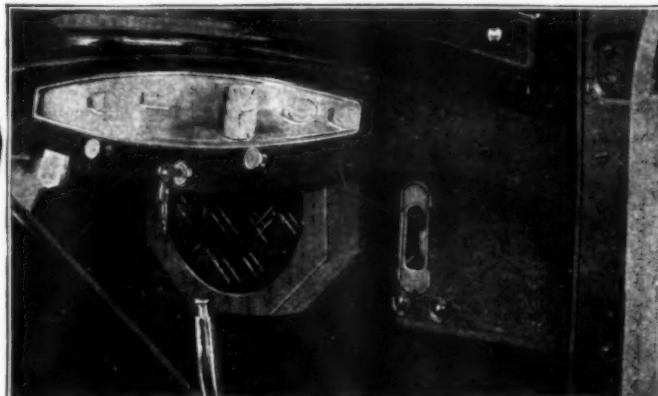
Mental Fading

354 Hunter Street, Ossining, N. Y.
Editor, *QST*:

During the past month I have been spending much of my spare time as a disciple of William James. It is difficult to imagine any subject more remote from radio, and it must be this very remoteness that prompts me to write you these lines, for I have just realized how many times I have fooled myself into thinking a signal was fading when actually there may have been no variation in the signal strength at all. How many others, day after day, feel like spitting on the Old Man's cat because a weak, elusive signal

SM

Man, Oh Man -What an Auto-Set!



And why not? It's a bang-up little console-quality receiver, but every inch of it is especially designed for its job. No "toy machinery," either. Like a locomotive—it's all engine.

Get this: three screen-grid tubes (yes, it's s.g. power detection)—sensitivity eight microvolts per meter—selectivity that slices 'em right off—real console tone—"vest-pocket" size (12" x 7 1/2" x 6 1/4")—and direct tuning like its big-brother Silver-Marshall radios. All there!

You don't need a jig-saw to get it in the car, either—it doesn't even touch the instrument panel. You mount it under the cowl, to the right of the driver's seat. And if you want to take it out to ride in the car, not a mark will show!

The cost? It's way down. The list price is only

The Short-Wave Bearcat Is a Bearcat!

Designed to lick anything in the short-wave class, the 737 Bearcat does—and how! It has two screen-grid tubes—will reach out and drag 'em in by the heels—is plenty selective—and you can spread the ham bands without taking the set apart and moving half of it away. It's completely shielded—has its own cabinet—and its own built-in power supply!

Eight specially-designed plug-in coils (included

The Radiobuilder, Silver-Marshall's publication telling the very latest developments of the laboratories, is too valuable for any setbuilder to be without. Send the coupon for a free sample copy. If you want it regularly, enclose 50c for next 12 issues.

4,000 Authorized S-M Service Stations are being operated. Write for information on the franchise.

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\$112 wired, without tubes—and that includes the receiver, a hot little speaker that will threaten to win you back to magnetics for life, battery box, brackets, spark suppressors, and everything you need to install it.

Tubes required: 3-24, 1-12A, 1-71A.

The Receiver—S-M 770 Auto-Set (only), factory-wired and RCA-licensed, \$79.50 List. Parts total \$61.40 List.

The Speaker—S-M 870 Automotive-Type Magnetic Speaker, \$15.00 List.

Accessories for Installation—S-M 771 Accessories, including all other required equipment except tubes and batteries, \$17.50 List.

Get in touch with your jobber for the low-down on price and performance!

Silver-Marshall, Inc.
6409 West 65th St., Chicago, U. S. A.

Send your new catalog supplement with sample copy of the Radiobuilder.

4c enclosed; send Data Sheets giving complete information on the Auto-Set and the Bearcat.

Name.....

Address.....

Weston model 425

thermo
instruments
for

SHORT WAVE Radio Service

THE public is as yet little aware of the functions of short wave radio which occur in that mystic band below 200 meters where the middle man of distribution — the broadcasting station — is seldom required. But science and engineering know and appreciate its multitudinous services.

In aviation — for weather reports and beacon signals; in the marine — for land and sea communication; in railways — for long freight hauls in government service — for coast guard boats, tugs and tenders; for police alarms and for all manner of civil and commercial uses where quick and unlimited conversational contact is essential, two-way short wave communication is now in universal vogue.

For the operation of short wave transmitters it is necessary to employ a radio frequency ammeter to accurately gauge the amount of energy imparted to the antenna. In industry, also where radio frequency currents are used, such as in bombarding of tubes, and induction furnaces, the same type of instrument is required. It is used in telephony, in television, by manufacturers of a variety of radio apparatus such as crystal control equipment and, of course, by amateur transmitters the world over.

For all these services the preferred testing equipment consists of the Weston Model 425 thermo instruments made as ammeters, milliammeters and galvanometers, together with accompanying voltmeters — Model 301 for D.C., and Model 476 for A.C. service. All instruments are matched in size and appearance — 3½ inch diameter — for flush panel mounting.

For complete descriptions and
prices write for Circular JJ

Weston Electrical Instrument Corp.
602 Frelinghuysen Ave. Newark, N. J.

Weston
PIONEERS
SINCE 1888
INSTRUMENTS

seems to drift in and out of audibility, apparently due to unavoidable QSB, when actually the trouble is not with magnetic storms, atmospheric conditions, wave polarization or other *cause psychosi*, but with the thin layer of cortical cells overlaying the brain of the operator himself! Psychology gives us a very interesting description of the power of "paying attention" and it may explain away many instances of annoying QSB.

Let us assume that we are listening to a very weak signal from a crystal-controlled transmitter. We can barely distinguish the dots from the dashes. We concentrate our attention upon the signal. Perhaps we close our eyes or darken the room, and we find that this helps. (It shuts off light-stimuli that would produce sight-sensations to interfere with the sound-sensations, thus eliminating a great obstacle to concentration.) First we are able to catch several words, and then the signal *seems* to fade out and we miss several words. In a few seconds the signal *seems* to fade in and we catch a little more. This continues indefinitely.

Now psychologists tell us that attention is a state of consciousness which cannot endure over any but the shortest periods. In fact the average person is able to concentrate for only 5 or 6 seconds at a stretch. Oftentimes when we seem to be attending for a long period of time to some one thing, our attention is really drifting and wandering all over the background of our mind without our knowing it. When we find it hard to concentrate, it may be some consolation to know that no one has ever succeeded in maintaining strict attention over stretches of more than 24 seconds.

To a psychologist the reason for this is simple, and by an apt analogy any radio operator may understand it. The control brain cells receive the sound-sensation telegraphed over the nervous system from the ears in the form of a charge, and immediately "explode," just as an electrolytic condenser receives a charge at a pressure so great that the dielectric punctures or "explodes." When a cortical brain cell explodes we "get an idea"; i.e., we are conscious of hearing a signal. Thus, each dot and dash is telegraphed over a nerve fibre from the ear to the brain, and explodes a cortical cell. When a cell has exploded it must take time to recover; it cannot explode again until its "dielectric" repairs itself so it can hold another charge, just like the electrolytic condenser. When these cells are repairing themselves they will not respond to sound-sensations, and we are not conscious of hearing any signal until some sound cell in the cortex starts working again. That is why attention is interrupted, why we can concentrate for only a few seconds at a time, although we sit and stare into the darkness for hours at a stretch, "concentrating." The spurts of our attention correspond to the successive explosions of cortical cells, and as our attention spurts, the signal fades in and *vice versa*.

If anyone should doubt this, here is a simple experiment to prove that attention is interrupted, not continuous:



Here's the Solution of Your Condenser Troubles!

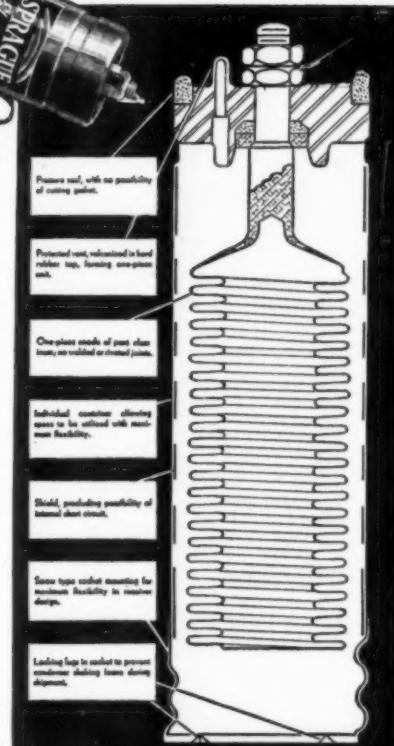
DON'T worry about condenser problems. If they involve 8 MFD or more —let the Sprague electrolytic condenser take care of them. For this new, perfected condenser is the most adaptable and efficient unit you ever saw. Only $1\frac{3}{8}$ " in diameter and only 5" height overall. Yet it rates 8 MFD capacity with peak voltage of 430 DC.

It has an exclusive, one-piece, round-edged anode without a single soldered or welded joint anywhere. The individual screw socket mounting makes it easily adaptable to use in any set.

And because of the Sprague standardized unit construction—you buy just the amount of capacity you require, without paying a premium for useless excess or for "special built" jobs.

Write for illustrated folder on the Sprague electrolytic condenser.

SPRAGUE SPECIALTIES COMPANY
QUINCY, MASS.
Manufacturers also of the well-known
SPRAGUE PAPER CONDENSER



SPRAGUE Electrolytic CONDENSER

Capacity 8 MFD
Peak Voltage 430 DC
Can Negative

AN

EVER INCREASING NUMBER

OF BROADCAST STATIONS
AMATEURS, EXPERIMENTAL LABS

ARE USING **FLECHTHEIM** EXCLUSIVELY
SUPERIOR CONDENSERS

REASON #1 —

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QUALITY

Only the very
best materials
are used — and
then only after
the most rigid
tests. They
DO stand up!



TYPE VM 200-2 MFD.
5000 V D.C. -3300 rms RAC

Send for Catalog #22

A. M. FLECHTHEIM & CO., INC.
136 Liberty Street New York, N. Y.

THE A.R.R.L. LOG SHEET

New Regulations Require Station Log

The new amateur station regulations of the Federal Radio Commission, announced in May *QST*, oblige every amateur station to maintain a log of operating activity. Every station ought to keep a log. A.R.R.L. has been preaching it for years. Now it becomes compulsory under the regulations.

A well-kept log gives proof of station transmissions. It is invaluable in checking up the records of your work. Its presence identifies your station as a systematic one. The Government now requires it as a record of transmitting activity.

Being purchased now in large quantities, the price of the Log Sheet has been substantially reduced. The new low prices:

100 sheets	50c
250 sheets	\$1.00
500 sheets	1.75

(Postpaid)

**THE AMERICAN
RADIO RELAY LEAGUE**
Hartford, Conn., U.S.A.

Seat the subject blindfolded in a chair, so that he sits sidewise to the length of the room. Hold a watch at the level of his ear, and remove it until its ticking is only just audible. As he listens the sound will alternately disappear and reappear. Let him lift his finger at each disappearance. Count off on the watch the number of seconds between successive disappearances. Compare the interval with the interval between "fading" signals.

Of course there is no remedy for this kind of mental QSB, but it may be a consolation to some operator of a crystal-controlled m.o.p.a. to know that it is probably the brain of the operator on the receiving end that is fading, and not his transmitter.

— Earl Peacock, ex-W2ADH

More Truth Than Fiction

75 New Haven Avenue, Milford, Conn.
Editor, *QST*:

Just a few words about things in general — especially 85-meter 'phone. There was a time once when you would only hear about thirty 'phones in any one day and everyone was having a good time working the same fellows; in other words, just like a great big family. (Ask W2GJ — hi.) Then suddenly everyone else goes 'phone-crazy and now look at the band! At least ninety fellows on regularly, and who works whom and how is more than most of us can figure out. I can't now — I used to.

I overheard some 'phone man once discussing on handling traffic on 'phone. He said that he couldn't see anything in it. But look at what some fellow out west in the wide open spaces (thank Heaven there are a few in that 'phone band!) did on the band with traffic — made the B. P. L.! I myself handled over fifty messages on the 'phone outfit with W1AJI at Naugatuck, who is one of the best traffic men on 'phone within the State. All these in two nights.

Alas for the 'phone band! After a very pleasant two months on the air, my poor 250 and 227 stand deserted in their sockets, while ye 210 is up to his neck in milliamperes down on the good ole twenties where you can come up for air whenever you feel like it.

Guess that's all this time but maybe I'll find something else to spill soon.

— Emil F. Scholz, W1AMQ-W1FJ

I.A.R.U. News

(Continued from page 50)

is ever handled by these stations we can't help thinking it rather unnecessary to spoil our bands in this unscrupulous way.

GREAT BRITAIN

By J. Clarricoats, Hon. Sec'y R.S.G.B.*

It will be remembered that in our last notes mention was made of the fact that our licensing authorities had once again opened up the 80-

Just Off Press

5TH REVISED EDITION

"Radio Theory and Operating"

By Mary Texanna Loomis

America's best known and most successful radio instructor; President, Loomis Radio College; Member, Institute of Radio Engineers. This text has been enlarged to 1,000 pages and over 800 illustrations, and is made up of the same high class paper with red kraft leather stamped in gold. The book is written in a systematic style and is right up to date, thoroughly covering much new material on circuits required for obtaining Government licenses of different grades, amateur short waves, broadcast transmitters and receivers, aircraft radio, television and talking pictures. No other radio book is so comprehensive. In use by all Government radio schools, leading radio schools in U. S. and Canada and over 400 universities, technical colleges and high schools.

Price \$4.25

Postage paid this and foreign countries

This book is written in such a clear manner that the principles of radio can be easily grasped by anybody reading at home. While this is the standard text book in a great many educational institutions, it is not necessary to attend a radio school in order to gain a practical knowledge of radio from its contents. The users of this book are found at the top in every branch of radio work — some as designing and constructing engineers, many in research laboratories and talking movies, and a great many in broadcasting stations and on the ships. Recognized by radio experts as the book of outstanding merit in the radio world. The reputation of this book is so well established that each edition has sold out before the next edition was ready to deliver.

The 5th edition will be for sale by leading bookdealers
in this and foreign countries

Enclosed find \$4.25, price in full, for which please send me one copy of *Radio Theory and Operating*.

Name.....

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LOOMIS PUBLISHING CO.
405 Ninth St. N. W. Washington, D. C. Dept. 3

FROST-RADIO engineers have banished noise from wire-wound volume controls!

THE necessary use of wire-wound Volume Controls in high gain Radio Receivers has presented fresh problems to the manufacturer of potentiometers and rheostats. Previous standards and methods of manufacture having proved to be wholly inadequate, radically new and different materials and processes were required, and it remained for FROST-RADIO Engineers to develop these.

They have perfected an automatic device for rounding and polishing the contacting edge of the wire. This process so perfectly forms the wire edges that there is not one ten-thousandth of an inch difference in height between any adjacent wires. A velvet smooth contacting surface is thus provided.

They have proven that the new FROST-RADIO Volume Controls will withstand a fatigue test of two hundred thousand half-cycles, at a speed of thirty per minute, without evidence of wear on wire edge or contact arm, and that they are as perfectly noiseless at the completion of test as before being subjected to fatigue.

A complete treatise on the subject of volume controls has been prepared by our research laboratory. We will be glad to send a copy to any interested engineer.

HERBERT H. FROST, INC.
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PROCRASTINATION is a 75c word

But you'll lose more than that if you don't get your Handbook soon. You KNOW Handbook must be had. It's EASY to get. Don't procrastinate. Proceed as follows:

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meter band for week-end work. Since that date some 150 of our members have received permission to operate on this useful band, and as result considerable activity is anticipated.

Arrangements have been made to hold the Annual Convention in London on September 26th and 27th. As in previous years amateurs from all countries will be heartily welcomed to this gathering. Intending visitors are requested to advise the Headquarters of the R.S.G.B. at 53 Victoria Street, London, S. W. 1.

The Annual Radio Exhibition has been fixed to take place between September 19th and 27th, so that visitors to the Convention will be given an opportunity of attending at Olympia.

The recent 28-mc. tests organized by our Contact Bureau Section were successfully concluded during May. The winner of the transmitting trophy was W. H. Winchcombe, G6ZH, whilst Miss B. M. Dunn, G6YL, won the receiving price.

The experimental section propose organizing their next 28-mc. tests towards the end of 1930. Detailed announcements will be given shortly.

Conditions on 14-mc. during May were again poor for the period of the year, and no outstanding work can be recorded.

On 7-mc. local "blanketing" was pronounced but moderate DX was workable.

Information concerning the Society can be obtained from the Honorary Secretary at the above-mentioned address.

The following Norwegian notes combine the reports for both April and May, as both were received within the month:

(Continued on page 84)

The Third International Relay Competition

(Continued from page 21)

	Belgium	Egypt
ON4BC	42	SU8RS.....
Philippine Is.		
KA1CY	28	Irish Free State
KA1HC	3	EISB.....
Spain		Denmark
EAR37	14	OZ7Y.....
So. Rhodesia		West Africa
FO3SR	14	FQ-PM

Say, Son —

(Continued from page 22)

what was left into the port of Algiers and told the head devil there that if ever again an American ship was molested he would come back and bust the entire place wide open. A treaty was signed with some penalties in it that would make you think you had got a shot of bad home-brew.

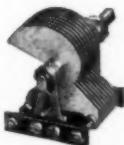
Steve ambled on along the coast, found some

Ideal Amateur Receiver!

NEW NATIONAL A. C. THRILL-BOX

DOUBLE SCREEN-GRID

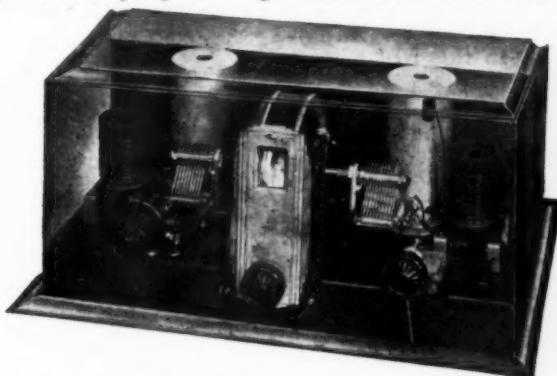
Easily assembled by anyone with genuine NATIONAL Radio Products



New type SE-100 S. W. Condensers. Insulated bearings, constant impedance pigtail, straight frequency line plates.



The coil-forms used in the new THRILL-BOX are made of R-39, the low-loss coil-form material recently developed by Radio-Frequency Laboratories.



Full A. C. operation — NO HUM, even on phones. Easily adapted for wide spread of Amateur Bands. Dial and Condenser construction eliminates "clicking" on higher frequencies. Completely new design by NATIONAL Co., Engineers in collaboration with Robert S. Kruse. Made also in new battery Model, using the new UX 230, 231 and 232 tubes. Special S. W. Power-Pack, licensed under RCA Patents. Send for new Amateur Bulletin No. 141.

NATIONAL CO. INC.

SHERMAN, ABBOTT AND JACKSON STREETS, MALDEN, MASS.

QST Oscillating Crystals

REDUCED PRICES EFFECTIVE APRIL 1st, 1930

AMATEUR BANDS:

Summer is coming, and no doubt you are going over your transmitter removing those weak links so as to get the most possible efficiency from your set.

One item of great importance is the *frequency stability* of your set. Does it stay on *one* frequency? If not, our *power crystals* will solve that problem. SCIENTIFIC RADIO SERVICE crystals are known to be the best obtainable, having *ONE* single frequency and highest output. With each crystal is furnished an accurate calibration guaranteed to *better than a tenth of 1%*. *New prices* for grinding *power crystals* in the *amateur bands* are as follows:

1715 to 2000 Kc band	\$15.00 (unmounted)
3500 to 4000 Kc band	\$20.00 (unmounted)
7000 to 7300 Kc band	\$40.00 (unmounted)

BROADCAST BAND:

Power crystals ground in the 550-1500 Kc band accurate to plus or minus 500 cycles of your specified frequency fully mounted for \$55.00. In ordering please specify type tube, plate voltage and operating

temperature. All crystals absolutely guaranteed regards to output and frequency and delivery can be made within two days after receipt of your order.

CONSTANT TEMPERATURE HEATER UNITS:

We can supply heater units guaranteed to keep the temperature of the crystals constant to *better than a tenth of 1 degree centigrade* for \$300.00. Two matched crystals, ground to your assigned frequency in the 550-1500 Kc band with the heater unit complete \$410.00. More detailed description of this unit sent upon request.

ATTENTION AIRCRAFT AND COMMERCIAL RADIO CORPORATIONS:

We invite your inquiries regards your crystal needs for Radio use. We will be glad to quote special prices for *POWER* crystals in quantity lots. We have been grinding *power* crystals for over *seven years*, being *pioneers* in this specialized field, we feel we can be of real service to you. We can grind *power crystals* to your specified frequency accurate to plus or minus .03%. All crystals guaranteed and prompt deliveries can be made. A *trial will convince you*.

SCIENTIFIC RADIO SERVICE

"THE CRYSTAL SPECIALISTS"

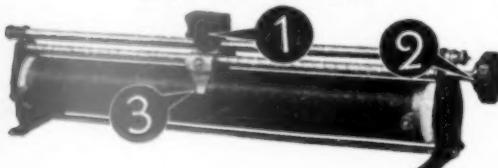
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• Radical Improvements that meet Modern Demands

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- 1 One hand operates the HH Tubular Rheostat. Grasping slider knob automatically disengages screw mechanism for rapid sliding. Release restores screw engagement as soon as knob is turned.
- 2 Screw adjustment mechanism is self supporting, self aligning. No binding.
- 3 Heavy phosphor bronze contact shoe maintains firm contact with wire but cannot tear it.

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Are YOU

willing to work for further success in Radio? Have YOU had enough experience to know that you can't get, for nothing, something worth having?

If so,

clip this out and send in your name and address — it will bring you our new booklet, MODERN RADIO, describing an advanced course in PRACTICAL RADIO ENGINEERING — a course that is being studied by hundreds of experienced radiomen in all parts of the world — a course written and conducted by engineers with years of experience in practical radio work and in instruction work in ADVANCED RADIO.

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Branch of Radio

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Incorporated

3166 Mt. Pleasant St., N.W.
Washington, D. C.

Tripolitan pirates and put on the same act with them. At Tunis he played another one-night stand and then, washing up, came on home.

In 1815, when Steve got home, they gave him a blue silk flag. This identical flag is the one that hangs in the auditorium at the Naval Academy to-day. Don't any ham with red blood in him ever go anywhere near Annapolis without going to that flag and standing at salute just a moment.

The instrument of torture hanging on the wall at A.R.R.L. Headquarters and the instrument of torture shown on Stephen Decatur's flag are suspiciously alike. Their meanings are exactly alike — a he-man type of law and order, or the works. And now, you all ask, whence came our Wouff-Hong? Thereby hangs another tale, lads.

The Old Man.

The Operating Characteristics of Vacuum-Tube Detectors

(Continued from page 28)

of two tubes of this type as grid detectors under similar operation conditions. A greater variation than in the case of plate detection is evident, as would be expected from the greater variations in grid characteristics of the tubes.

The effect of changing the percentage modulation of the input signal upon the detector output and gain is shown by the curves of Fig. 16. It is apparent that the output, and hence the detector gain, is directly proportional to the percentage modulation as long as the detector is not greatly overloaded.

(The second and concluding part of this article will appear in the next issue. — EDITOR.)

The Hudson Division Convention

(Continued from page 42)

And then came the distribution of prizes to those who participated in the stunts; also attendance prizes. The prizes far exceeded the anticipation of the Committee, but lack of space prevents us from giving the names of all the contributors; proper acknowledgment is, however, made and appreciation expressed to all those friendly manufacturers who helped so much to make the convention a success.

The report of this convention would not be complete without extending the thanks of all the delegates to Dr. Walsh, A. O'Hara, Ed. Finek, Dave Talley, Frank Frimmerman, C. E. Sargeant and other members of the Committee for making possible the best convention ever held in New York City.

— A. A. H.

Vitrohm Stabilizing Resistors

When the plate potential of radio transmitters is supplied by filtering rectified A. C. it is common practice to connect a stabilizing resistor across the output of the plate supply.

The advantages are:

1. Protects the filter condensers from high peak voltages, which lengthens their life.
2. Steadies the note.
3. Tends to eliminate chirps.
4. Discharges condensers when key is open.

Send for circular 507, describing Vitrohm Resistors for radio. It will be sent without charge upon request.

You will find in this circular Vitrohm Resistors to meet every radio requirement.

Output Voltage	Total Resistance	Vitrohm Resistors
250	25,000 ohms	1—Cat. 507-65
550	50,000 ohms	1—Cat. 507-68
1000	50,000 ohms	2—Cat. 507-65 in series
1500	60,000 ohms	3—Cat. 507-5 in series
2000	80,000 ohms	4—Cat. 507-5 in series

WARD LEONARD ELECTRIC CO.

Mount Vernon, New York

TRANSMISSION CONDENSERS



Send for interesting data and price sheet on Transmission Condensers with working voltages up to 3000 D.C. for use with the following tubes: 203A, 204A, 210, 500W, 851, 852, 860, 865.

CORNELL ELECTRIC MFG. CO.
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ALUMINUM SHIELDS

GENUINE ALCOA STOCK
ANY SIZE TO ORDER
MONITOR SIZE 6" x 10" x 7" \$3.25
BLAN, The Radio Man, Inc. 89 Cortlandt Street
New York City

Send for a copy of our latest Radio Bargain Bulletin No. 31



American Sales Company 19-21 Warren Street New York City

RADIO BARGAINS FULLY GUARANTEED

Tubes UX type, 30 day replacement guarantee, No. 210, \$2.25; No. 250, \$2.35; No. 281, \$1.85; No. 280, 95c; No. 245, \$1.25; No. 224, \$1.25; No. 227, 75c; No. 226, 65c; No. 171, 75c.
Low Power Transmitter, adaptable for phone or code, With plug-in coils..... \$14.75
Short Wave Sets, one tube complete with 5 coils, 14 to 550 meters..... \$6.45
Auto Radio—Uses 3-224 and 3-227 tubes, single dial, tremendous volume. Compact. Fits any car..... \$20.00
Stromberg Carlson telephone transmitter on desk stand..... \$2.75
B Eliminator, Dry, 180 volts, will operate up to 10 tube set, with 280 tube, fully guaranteed..... \$6.75
250 or 245 Power Condenser Blocks, 12 Mid., 1000 volt A. C. test, tapped 2,2,4,1 and 1 mid..... \$4.75
2 Mfd. Condenser Packs, 2000 volt A. C. test..... \$7.95
1500 volt..... \$3.80
Double Chokes, 30 henry each, 160 mils, 1500 vt. test, shielded..... \$4.95
130 mils..... \$3.75
Power and Filament Transformers for 226, 227 and 271 tubes, with double choke..... \$4.00
No. 1003 Power Transformers, shielded, Sec. 600 V. for one 281, one 250, one 227, four 226 tubes and 2 chokes..... \$5.00
A.C.-A. C. Power Packs, completely assembled, \$8.75. 250 V. B. also has A. C. filament for up to 9-tube set. Can be used as B eliminator. Make your battery set all electric, or build your A. C. set around this pack. 280 tube for this pack, 95c extra.
Thordarson Transformers, 1 to 1..... \$1.00

CHAS. HOODWIN CO.
4240 Lincoln Ave., Dept. H-8, Chicago, Ill.
DEALERS IN BANKRUPT RADIO STOCKS

W9ANZ

(Continued from page 48)

A large number of reports have been received via mail, about two-thirds of which were from amateurs not worked or from short-wave BCL's. One of the latter wrote as follows: "I heard your station W9ANZ in communication with another station whose call I understood as CQ. Please verify!"

I.A.R.U. News

(Continued from page 80)

NORWEGIAN SECTION

By G. H. Petersen, Vice-Pres. N.R.R.L.

During April we organized local sections of our League in Oslo, and in Bergen the hams have long ago united to form a Society. While the number of Norwegian amateurs is still not very great, we sincerely hope that the formation of Sections to cater to the social side of the League work also will stimulate interest between members and non-members alike.

Our second WAC member is LA1W. He is a very active amateur, and incidentally has the first transmitting license issued and still in force in this country, so his WAC will be well deserved. His report points out that conditions on 14-mc. have been very bad during the last weeks, at least for DX, nothing but European contacts having been made. However, our President, LA1G, disagrees with him, still keeping up his list of ZL and VK's, and now deeply regrets that the world was not made bigger! The Oslo gang has got a powerful addition in LA1H, the Oslo Sailor School, who with its 500 watts is working all the world.

The Bergen gang also is still getting out. L1AR now works exclusively on 14-mc. and for DX, recently "made" two "W's" in an evening.

We are making our best efforts to improve the QSL service to Norway, asking all other hams to coöperate.

Conditions during May, as judged by our reports, have been distinctly bad, the only QSO's reported outside Europe being Australia and South Rhodesia by LA1G. However, the activity among Norwegian amateurs luckily shows no tendency to decrease with the approaching summer, several of our boys striving hard for the WAC Club membership. The general movement to the 14-mc. from the congested 7-mc. band is still going on. Wonder how the 14-mc. band will be in some months if the movement is general?

Our bi-annual General Meeting will be held at Oslo on August 9th and 10th, and we will try to combine it with a hamfest of the latest pattern. We want to repeat our invitation to all foreign hams to join us, if they should happen to visit our Land of the Midnight Sun at that time. In this connection we want to present our thanks for kind invitations to several conventions and congresses this summer. We certainly regret that we are probably unable to send special delegates, but



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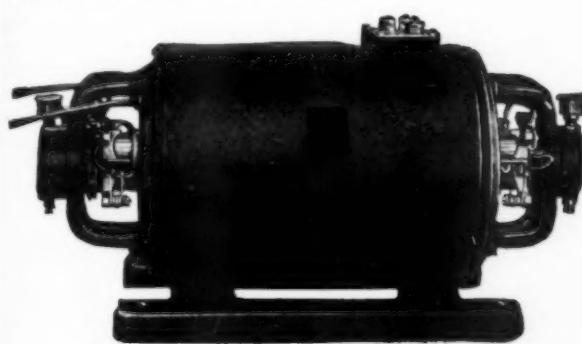
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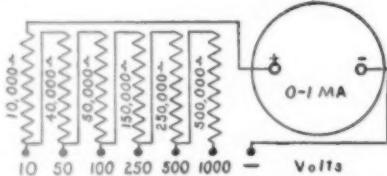
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have passed the invitations to our members, in case anyone might be able to attend.

SOUTH AFRICAN SECTION

By A. Loquet, Hon. I.A.R.U. Sec'y, S.A.R.R.L.

The Fifth Annual Conference of the South African Radio Relay League was held at Durban on April 18, 1930. It was very successful from every point of view and a large amount of business was dealt with, including the drafting of a new constitution. This was necessary owing to the rapid growth of our League during the past two years. We are now over 300 strong and have members in all parts of the African continent, and our ranks are still rapidly growing.

"QTC," the official organ of the S.A.R.R.L., has also improved wonderfully during the past year, and every one should give a vote of thanks to those responsible for its production.

The delegates to Conference were the guests of Div. 5, and those of us who had the pleasure of enjoying their hospitality will long remember it.

At the Conference Dinner our President, Joseph White, broadcast his speech and told the public a few things about amateur radio and the S.A.R.R.L. which were good to listen to.

The Conference sends greetings and good wishes to kindred societies and amateurs the world over.

Having concluded the Reports of the National Sections of the I.A.R.U., we are happy to present for the information of the membership the following report regarding Jugoslavian amateur activity, which is made up of excerpts from a translation of a letter to the I.A.R.U. from the Udruzeni Jugoslavenski Radio-Amatori, in connection with official business of the Union.

"Our Section started under Austria-Hungary in 1918, and after that year many nations were united into what we call Jugoslavia. On account of the war we could not have any outside contacts and worked among ourselves. On account of the tension after the war amateurs did not get much attention regarding licenses. We therefore trans-

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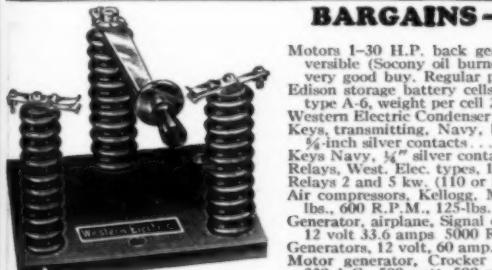
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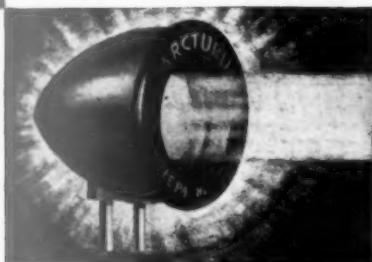
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Information on how to receive and utilize the signals is given in Bureau of Standards Letter Circular No. 280, which may be obtained by applying to the Bureau of Standards, Washington, D. C. Even though only a few frequencies are received (or even only a single one), persons can obtain as complete a frequency meter calibration as desired by the method of generator harmonics, information on which is given in the Letter Circular. The schedule of standard frequency signals is as follows:

Eastern Standard Time	Frequency, Kc.					
	July 21	Aug. 20	Sept. 22	Oct. 20	Nov. 20	Dec. 22
10:00 P.M.	1600	4000	550	1600	4000	550
10:12	1800	4400	600	1800	4400	600
10:24	2000	4800	700	2000	4800	700
10:36	2400	5200	800	2400	5200	800
10:48	2800	5800	1000	2800	5800	1000
11:00	3200	6400	1200	3200	6400	1200
11:12	3600	7000	1400	3600	7000	1400
11:24	4000	7600	1500	4000	7600	1500

Strays

I. R. E. Convention

The Fifth Annual Convention of the Institute of Radio Engineers will be held in Toronto, Canada, August 18th to 21st, with headquarters at the King Edward Hotel. This meeting will also be known as the First International Convention of the society.

A well-balanced program has been arranged, including technical sessions, exhibits, a golf tournament, tours to various radio manufacturing plants as well as points of interest in the vicinity, and other features.

Information regarding the Convention may be obtained from the Institute headquarters, 33 W. 39th Street, New York City.

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